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THE RAW APPLE DIET IN THE TREATMENT OF DYSENTERY.¹

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History.

ACCUSTOMED as we are to associating alimentary disturbances with an excess of fruit in the diet, it seems paradoxical to suggest that disease of the gastro-intestinal tract can be successfully treated by a diet consisting of fruit alone. Quite recently, in 1932, however, René Mignot⁽¹⁾ and later J. Mouzon⁽²⁾ in the French Press drew attention to a method practised in Germany and Switzerland by which such disturbances were treated by a diet consisting of raw apples. About forty years ago

Dujardin-Beaumetz and, more recently, von Noorden advocated the use of fruit in diarrhoea. About thirty years ago, a bone-setter named Hessing gave raw apples to infants troubled with vomiting or diarrhoea. More recently, Sister Frida Klimsch, of the Children's Sanatorium in Koenigsfeld, used a similar diet. During the war German soldiers suffering from dysentery were surprised at the relief which followed the eating of raw apples.

For many years a practitioner in Koenigsfeld named Heisler⁽³⁾ had under his care a patient who had suffered from obstinate diarrhoea. He had sought the advice of many specialists in vain. The patient then fell back on an old-fashioned superstitious belief in raw apples as a cure for diarrhoea, and Heisler witnessed the patient's subsequent rapid recovery. Heisler then used raw apple in the treatment of all his patients suffering from diarrhoea, and published a book on the subject in 1928. A little later, Feer,⁽⁵⁾ of Zurich, reported that since

¹ Read at a meeting of the Queensland Branch of the British Medical Association on July 6, 1934.

1926 he had been treating celiac disease with a diet rich in vitamins and consisting of raw fruit (bananas, apples, oranges and bilberries). He also used the same diet in other disorders of the bowel. Feer, however, considered that there were difficulties in the use of this diet, on account of the patient's tendency to relapse when again given a normal diet. He therefore restricted this treatment to hospital cases which could be closely watched.

To Moro,⁽¹³⁾ of Heidelberg, belongs the credit of definitely establishing the raw apple diet as a means of treatment. He used it systematically in all the acute and chronic bowel infections of infancy, and with a simple technique gained consistent and rapid recoveries, even in the homes of his patients. His success with this treatment has been repeated by many well known paediatricians, and there has not been a single report of failure to achieve the same results. Among these may be mentioned Fanconi,⁽⁴⁾ of Zurich, Wolff, of Eisenach, Malyott, Wiskott, of Munich, Leffkowitz, of Berlin, Schreiber, of Fribourg in Brigau, Basch,⁽³⁾ of Vienna, Kohlbrugge, of Utrecht, and Madame Kaulberg-Marynowska, of Poland.

Method.

T. L. Birnberg,⁽⁹⁾ in 1933, summarized Moro's procedure in the treatment of these cases as follows:

The diet consisted of raw scraped apple only. There was no preliminary treatment—no purgation, lavage or initial water diet. He used thoroughly ripe apples and having peeled them and completely removed the core, converted them into a fine reddish-brown pulp by rubbing on a grater. This pulp was not cooked or sweetened but was taken raw in as large quantities as possible. One to four tablespoonfuls or more of this pulp were given every hour or two for 48 hours, the amount given varying with the age of the patient. The average quantity administered during the 24 hours was 30 tablespoonfuls.

For 48 hours no other food or medicine was given. If the patient was thirsty, a little water or weak tea was allowed. If dehydrated, normal saline, with or without glucose, was given hypodermically.

Birnberg stated that Moro⁽¹³⁾ added banana pulp to the apple if the apple alone were refused, and obtained favourable results. This made the apple more palatable in many cases.

Respecting the quantities used, Mouzon⁽²⁾ and Mignot⁽¹⁾ reported Moro's treatment somewhat differently. They stated that the food was given in five feeds, each feed consisting of 100 to 300 grammes of apple pulp. Thus the amount consumed each day was from 500 to 1,500 grammes (one to three pounds), or the product of seven to twenty apples a day.

Others recommended slightly different methods. For instance, Leffkowitz⁽¹⁰⁾ gave the apple whole, to be munched, or gave it grated, according to the patient's wishes. Heisler and Kohlbrugge⁽⁷⁾ preferred the apple unpeeled. They also liked the apple only partially ripe, as it was then more acid. They thought that stewed or baked apples were just as good, whereas Moro thought they were not quite as good as the raw apple. Wiskott⁽¹⁵⁾ in his severe cases gave water only for six to twelve hours before commencing the apple.

On the third day this strict diet was relaxed. Although the bowels appeared to be working normally again, nevertheless one had to take care that the patient did not return to an unrestricted diet too soon, as there was a danger of relapse. This was the critical time in the treatment. For some days a transitional diet was used, which varied with different authorities, but vegetables were always forbidden.

Moro⁽¹³⁾ gave the patient no milk or vegetable, his transitional diet being as follows:

7.30 a.m.	.. Cooked cereal (without milk). Toast. Cocoa—one cupful (made with water only).
12 noon	.. Soup with rice. Potato gruel. Scraped beef. Toast.
3 p.m.	.. Toast and tea.
6 p.m.	.. Cereal without milk, or cottage cheese. Toast. Banana. Cocoa (made with water).

Feer,⁽⁵⁾ Moro,⁽¹³⁾ and Schreiber⁽¹⁴⁾ forbade milk and allowed tea and cocoa made with water, biscuit, stale bread, bananas, white cheese, minced meat, potato purée and even eggs. Wolff⁽¹⁶⁾ and Wiskott,⁽¹⁵⁾ on the contrary, permitted weak milk mixtures. Fanconi⁽⁴⁾ allowed unsweetened butter milk, peanut butter, protein milk and white cheese.

Moro gave the child this transitional diet for forty-eight hours and then gradually allowed it to return to its normal diet. Milk was the next item added, then vegetables, and fruit last.

Treatment was commenced as soon as possible after the onset of symptoms. Nevertheless, after an analysis of his cases, Moro concluded that there was apparently no relation between the results obtained and the time of beginning the treatment. In his series of cases the raw apple diet had been begun in from eight hours to two months after the appearance of the diarrhoea.

Moro's reports were published in December, 1929, and were based on a study of 52 children between the ages of three months and ten years, the majority being from two to six years of age.

Kollman used the raw apple diet in 22 cases with excellent results. Ten patients were nurslings from three months to a year, and 12 were children up to four years of age. Wolff⁽¹⁶⁾ reported 100% of recoveries in 150 cases, three of the patients being very young babies with severe toxæmia. Marynowska,⁽⁸⁾ of Poland, reported 56 recoveries in 58 cases. Two proved refractory to this method of treatment as well as to all other methods.

With the institution of treatment improvement was rapid. The temperature soon began to fall. In Moro's cases it varied between 37.8° and 41.1° C. (100° and 106° F.) and on the average it was normal within forty-eight hours. The stools became less frequent. Instead of the average twelve stools a day, there was an average of three during the first twenty-four hours of treatment and one during the second twenty-four hours. Formed stools were passed within the first twenty-four hours. Mucus

was present in the stools in all cases of dysentery and the average time for its disappearance was sixty hours, or two and a half days. The average time for the disappearance of blood and pus was thirty-four hours. The blood and pus usually disappeared from the stools before the mucus. Abdominal pain, which was almost a constant symptom in the older children, was never increased by the diet and usually disappeared rapidly.

No one has reported having had any unfortunate experiences with the use of this diet. In two cases Moro noticed granular casts in the urine, but these disappeared when the amount of fluid was increased. However, all those who have used the raw apple diet warn their readers of the risk of dehydration, and therefore many advise that the children be treated in hospital under observation.

For some years before reading of this treatment I had been in the habit of giving children suffering from dysentery the juice of three or four oranges a day during the period of twenty-four hours of preliminary starvation. They were also given five teaspoonfuls of sugar to each pint of water or weak tea, or 7.5% glucose solution. After the first twenty-four hours I gave the children water foods. I continued to give the orange juice and allowed the pulp of three or four stewed or baked apples a day. The children did not appear to suffer for this and relished the additional nourishment. In August, 1932, I first read of the raw apple diet, and since that time I have used it in about fifty cases in my private and public hospital practice and I am able to confirm the truly remarkable results published by the European observers. I cannot remember any patient whose motions were not normal in appearance in from twenty-four to forty-eight hours. During this period there were generally two to three motions, of fairly large size, odourless and free from blood, pus and mucus. The motions looked very little different from the grated apple, except that there was a faecal-brown discoloration.

In the beginning I followed the recommendations of the Continental writers and forbade water; but my second and third patients—one a child of twelve years and the other a child of two years—soon ran high temperatures and began to look very ill. By adding water to the diet and giving a saline purge the two patients recovered in a few hours. Since that time I have encouraged the use of plenty of water and have not had a repetition of this trouble. Under European conditions the restriction of water may be safe, but it is not in Australia, and certainly not in Queensland. Nor can I see any reason, except in the presence of oedema, why water should ever be restricted.

I have had temporary failures, but always in cases where the parents did not carry out the advice given, sometimes on account of the parents' incredulity and sometimes in the case of a difficult child, where the mother had been unable to administer the diet. In these latter cases it is essential that the child be treated in hospital or that a trained nurse be placed in charge. When-

ever there was failure, success was later achieved by seeing that the treatment was properly carried out.

Regarding the quantity of apples taken, I always advised that the child be given twenty grated apples a day. It was seldom that the mother succeeded in giving more than twelve, and sometimes only six were given, but in all cases the results were equally good.

At first I hesitated to use the raw apple diet in the bad toxic cases at the commencement of treatment, but gave a preliminary water diet for twelve hours, as my patients were mostly private patients and some very sceptical. However, for the last twelve months I have put the children directly on the apple diet with as good and more immediate results.

The German writers considered that the grated apple could be given to infants as young as six months, but I have experienced the greatest difficulty in administering it to these patients and have abandoned its use. The German writers also extolled the use of grated apple when there was vomiting, but here again I met with failure, owing to the vomiting of the apple soon after it was swallowed. I therefore, in these cases, first of all overcame the vomiting in the usual way and then instituted the apple diet, which was always successful.

I have used the apple diet in other conditions as well as dysentery.

A neighbour of mine, a boy of eighteen years, had acute ulcerative colitis. He had severe abdominal pain and there was a large amount of free blood in the motions, which were loose and frequent. I saw him one morning at 9 o'clock and recommended the apple diet. I again called to see him in the evening. He had only taken six grated apples, but the last motion, passed just before I saw him, was the usual apple motion, free of any trace of blood, and the abdominal pain had entirely disappeared.

On one occasion when I had been called to see a child with dysentery, the mother informed me that the maid had a similar trouble, and I was asked to treat the maid also. After two days of the apple diet there was no improvement in the maid's condition, though the little girl was well on the way to recovery. The maid stated that she had carried out my instructions. As her condition was becoming worse, I ordered her to hospital. The next day I was informed that she was still worse. On again visiting her, I found her with a bowl of apple chips, for she said she could not swallow the grated apple. The hospital matron then saw to it personally that the maid took the grated apple, and in twenty-four hours she was much better and was passing normal motions.

Acting on the experience of Leffkowitz, I have tried the ungrated apple for older children, suggesting that the patient masticate the apple to the consistency of cream before swallowing it; but I have failed in each case. The patients became worse and small lumps of apple appeared in the motions. Apparently one cannot depend on children to masticate the apple sufficiently, and unless the apple is swallowed in a finely divided state, it does harm instead of good.

I have always used apple as a basis of this diet, but in some cases, where the patient tired of the apple, thoroughly ripe bananas were used with equally good results. In one case the child, the son

of a colleague, was given a variety of all the fruits in season, thoroughly grated or minced. The result was just as satisfactory.

The apple, however, seemed to lend itself best to grating, as it is firmer in consistency than most fruits. In the grating of the fruit it is the cellulose fibre which must be broken up.

Once the motions became normal I used a transitional diet similar to that advocated by Moro. The reintroduction of milk to the diet was always the greatest difficulty. For the older children I generally used Benger's food made with skimmed milk, commencing on the third or fourth day. I began with "Number 1" formula and on successive days used "Number 3" and "Number 4" formulae. Following this the Benger's food was made with whole milk instead of skimmed milk, and finally the Benger's food was dropped altogether. I found that very young children sometimes had relapses when given Benger's food. In these cases I gave them lactic acid milk after the first twenty-four to forty-eight hours of apple diet. I did not use the lactic acid milk (which, in my experience, has been safer than Benger's food) in the case of the older children, as they resented the acid taste. When using the lactic acid milk I prescribed two mixtures, one a lactic acid milk mixture and the other a sugar and water mixture. I instructed the mother to mix these together in varying proportions, commencing with a weak milk mixture and gradually increasing the proportion of lactic acid milk⁽¹²⁾ as follows:

	Lactic Acid Milk Mixture.	Sugar and Water Mixture.
First day	2 ounces	30 ounces
Second day	6 ounces	25 ounces
Third day	10 ounces	20 ounces
Fourth day	18 ounces	14 ounces
Fifth day	25 ounces	10 ounces
Sixth day	30 ounces	2 ounces

Larger quantities could be taken in each twenty-four hours so long as one kept to the same ratio of the two mixtures. One could make the lactic acid milk by Marriott's method, as follows:

To one pint of skimmed cow's milk, which has been boiled and allowed to cool, up to 45 drops of lactic acid (British Pharmacopœia) are added drop by drop, stirring well all the time. Sugar is also added.

In a similar way one might use F. H. Faulding and Company's "Lactone Syrup with Maltose", using one ounce to each pint of skimmed milk. This was somewhat easier to make.

Very seldom did relapses occur after the introduction of lactic acid milk. When there was a relapse, a return to the apple diet and then a longer period on the transitional diet always met with success.

Case Histories.

The following are some histories picked from cases I have treated myself.

CASE I.—The patient was a boy, aged eight years, from the Darling Downs district. He had been well till July, 1933, when he became listless and developed a temperature of 40° C. (104° F.). The motions were offensive and contained much mucus. Later they became creamy because of the large amount of pus present, and then dark in

colour owing to the presence of blood. The only other symptom was headache. This condition lasted fourteen days. He recovered, but a fortnight later had a similar attack. He was admitted to hospital, where he remained for ten weeks. His motions were very offensive and he passed many mucous casts. He recovered to all outward appearances, but about Christmas-time, 1933, had two more relapses.

I first saw him on January 4, 1934, when his motions were very offensive and contained much mucus. The boy was sluggish and was easily exhausted. His temperature was 37.8° C. (100° F.). I prescribed the raw apple diet, and next day his motions were normal. I continued with the apples for another twenty-four hours and then gave him water foods, and later lactic acid milk. In this case, owing to the long history, I was much longer than usual in prescribing a return to normal diet. I had a letter from the mother last week to say that the boy had been perfectly well since I last saw him.

CASE II.—The patient was a baby boy, aged fourteen months, from Brisbane, first seen by me in August, 1932. He had been well till two days previously, when, the mother said, he had vomited on two or three occasions and had become feverish. The next day he passed numerous, green, loose motions with much mucus. When I saw him there was no vomiting, but the motions were still numerous, about twelve a day, and continued mucus and traces of blood. The abdomen was sunken and the child listless and irritable when approached. I prescribed the raw apple diet, which the child took readily at first, but resisted later. In the first twenty-four hours of treatment he passed four motions, the last being the typical large apple motion with no free fluid and containing no mucus or blood. After forty-eight hours the child was given a transitional diet and its recovery was uneventful.

CASE III.—A child, aged twelve months, living in Brisbane, had been vomiting continuously since the previous evening. The vomitus was blood-stained. The temperature was 38.3° C. (101° F.). The bowels had not moved since the onset of the illness. The child was listless. The fontanelle was depressed and the abdomen sunken. I recommended the apple diet for this child; but it was immediately vomited. I thereupon gave her fifteen grammes (half an ounce) of bismuth carbonate mixed with an equal amount of water to make a paste. She was spoon-fed with this and then given six doses, each of 0.008 gramme (one-eighth of a grain) of calomel, at hourly intervals. One-half normal saline solution was also given in frequent small amounts, and later a 7.5% solution of glucose with sweetened orange juice. There was no more vomiting with the institution of this treatment, but several motions were passed. They were loose, dark green, and contained much mucus and a little blood.

Eight hours after the bismuth had been given, the apple diet was instituted and the apple was retained. In twenty-four hours the motions were normal; the child was then given lactic acid milk and later a normal diet. It made an uninterrupted recovery.

CASE IV.—The patient was a girl, aged eleven years, who came from a place near Brisbane and was first seen by me at a public hospital on May 15, 1933. She had suffered from dysentery since sixteen months of age and ever since had passed on an average eight or nine motions a day. The motions were offensive and contained blood, pus and mucus. She often complained of abdominal pain and was very easily tired. Examining her, I noticed she was very pale and had cyanosed lips. There were large indolent ulcers of the lower limbs, with many old scars. The whole abdomen was tender. The heart was considerably enlarged and there were numerous moist sounds in the bases of both lungs. Examining her rectally, the finger was soon obstructed by cicatricial bands. There was a recto-vaginal fistula. Her temperature varied from 37.2° to 38.3° C. (99° to 101° F.), and the pulse rate from 108 to 132 per minute. Her red blood cells numbered 1,320,000 and her white cells 6,200 per cubic millimetre. Neutrophile cells were in the proportion of 69% and lymphocytes 31%. Her hæmoglobin value was 20% and colour index 0.8.

This patient was given the apple diet and her motions became normal within forty-eight hours. Needless to say,

in this case, on account of the long history, the transitional diet was carried on for a much longer time than usual. Also the secondary anæmia was treated by giving *pilula ferri* in a dose of 0.3 gramme (five grains) three times a day. The ulcers on the legs were also suitably treated. The child's general improvement was remarkable. On June 13 the red blood cells numbered 4,300,000 and white blood cells 12,000 per cubic millimetre; the hæmoglobin value was 85% and the colour index 0.9. Instead of being fallow and cyanosed, the child had a bright red complexion and was no longer tired. The abdominal tenderness completely disappeared and the ulcers soon healed.

Surgical treatment was recommended for the condition of the lower bowel; but this was declined. She left hospital, looking healthy and robust, and to all outward appearances perfectly well. Last February 1 received a communication from one who knew her, stating that her improved condition had been maintained.

Apple Powder.

There are certain difficulties in the use of the raw apple diet. As before pointed out, some parents are afraid of using a diet consisting of so much fruit, for they associate an excess of fruit with ultimate diarrhoea. It is difficult also to get young children, especially nurslings, to take the large quantity of grated apple, which after a time tends to become brown. Furthermore, some apples, so Wolff⁽¹⁶⁾ states, have not got this curative property, especially the Gravenstein. Also apples are sometimes not available in Brisbane out of season, while in the distant parts of our State and in parts of the tropics they are never obtainable.

To overcome these difficulties, an apple powder, called "Aplona", has been put on the market in Germany. The powder is made from the unpeeled fruit dried *in vacuo*. This powder has all the advantages of the fresh fruit, even the flavour. It lasts a long time and readily mixes with warm water. It is more easily measured than the raw fruit and represents six times the same quantity by weight of fresh apple. There are six hundred calories to every hundred grammes. The pH is 3.3 to 3.75, being the same as that of the raw apple. "Aplona" is a yellow powder with a pleasant odour and dissolves in five to ten minutes in warm water or weak tea. The temperature should not be more than 50° C. No sugar should be used, but it may be sweetened with saccharine. It may be taken warm or cold. The initial dose is usually four grammes (one teaspoonful) to 120 cubic centimetres (four ounces) of water; but this amount can be increased or even doubled. There is one thing to remember, however, and that is, it must be prepared fresh each time.

The powder has a similar action to the raw apple, except that the motions are less moist, more homogeneous, and less granular in appearance.

The apple powder can be given to the youngest child more easily and successfully than the raw apple. Wiskott,⁽¹⁵⁾ Wolff,⁽¹⁶⁾ and Leffkowitz⁽¹⁰⁾ gave it to infants three to six months old. In the beginning one dissolves it in water, weak tea, rice water or oatmeal water, using two to five grammes (one teaspoonful) in a feed of one hundred grammes (three to four ounces) six times a day. Later it can be mixed with buttermilk, milk (which it does

not curdle) or broths. It is sometimes advantageous to continue the apple powder for four or five days at least, mixing it with other food.

In mild cases Leffkowitz⁽¹⁰⁾ does not stop the milk. He puts up to thirty or forty-five grammes of the apple powder in the feeding bottles each day instead of sugar. He does not advise the Heisler-Moro treatment in the severe forms of dysentery in the nursling. At this age all observers call attention, even in the case of the apple powder, to the dehydration which not only may lead to the disappearance of any oedema that is present, but which may also become dangerous. They give saline solution subcutaneously to overcome this danger. Never having restricted the water intake, except in the two cases mentioned, I have never had to give saline solution subcutaneously. In the case of the nursling, all Continental observers agree that the treatment should be given only in hospitals where it can be watched closely.

I have been unable to get samples of this powder. Since last year I have been in communication with Messrs. H. Jones and Company, Proprietary, Limited, of Hobart, and they have now manufactured a dried apple powder, which will probably be called "Apple" and which, I hope, will soon be on the market.

I was supplied with a four-pound tin only last month, and so far have used it with success in three cases: one of vomiting and two of diarrhoea. The vomiting child did not reject the powder, as did other children who were given the raw apple, and I gave it at the commencement of the treatment.

The apple powder therefore appears to have several advantages over the raw apple: it can be kept for long periods; it can easily be sent to remote parts of the State, and it can be procured when apples are out of season; it can be given to very young children and difficult children who would otherwise refuse the raw apple, and it is said that it is not rejected when given to children who are vomiting; it can also be used where the sceptical parent refuses to allow the raw apple diet.

The Action of the Apple.

Although all writers are in agreement regarding therapeutic results of the raw apple diet, they do not agree in their reasons for its success. Various ingredients of the apple have been considered in turn, namely, the vitamins, malic acid, tannin, cellulose and pectin. Some consider the action a mechanical one, others antitoxic, and still others bactericidal.

Heisler⁽⁶⁾ thinks that the malic acid is primarily responsible for the beneficial results. He also imagines that the grated apple has a mechanical cleansing effect and that the tannin also plays a part.

Kohlbrugge⁽⁷⁾ considers that similar results can be obtained by lemon juice and that they are due to the fruity acid present in the apple. He therefore recommends unpeeled, finely grated apple, since the peel and the layer just below it are richer in acid

than is the pulp. He disregards the tannin, as many diarrhoeal conditions do not benefit by the giving of tannin.

Moro attributes the success of the treatment to the tannin, believing that it forms, by virtue of its astringent property, a membrane over the surface of the intestinal mucosa, which protects it against all irritation. Winckel also considers the tannic acid to be the beneficial factor.

Malyott⁽¹¹⁾ believes that the pectin is the element responsible for the good results. Pectin is present in the juice of many fruits, and by virtue of its colloidal and its inherent buffer properties he considers it to have the power of regulating the hydrogen ion concentration; also, because of its colloidal nature, it is able to absorb both the endogenous and exogenous poisons. Further, through its calcium and magnesium content, it acts as an inhibitor of peristalsis. As grated apple contains finely divided cellulose together with the pectin, Malyott considers that the apple forms, instead of a pabulum, a colloidal absorbent mass which takes up the bacteria from the intestine. The bacteria are absorbed into this mass, which acts like a sponge, and are thus carried away. In the same manner the amines, which result from the pathological disturbance of the bowel, are absorbed and disposed of.

Schreiber⁽¹⁴⁾ made a bacteriological examination of the motions of ten children given the apple diet. He noticed that the pathogenic organisms rapidly disappeared, but that the *Bacilli coli* increased in numbers correspondingly quickly.

Conclusion.

In the cases in which I have not had immediate success the patients have been babies under a year of age or those whose symptoms have been accompanied by vomiting. It is in these cases that the apple powder is especially advantageous, for it has been given to babies as young as three months and in cases associated with vomiting. I can therefore conclude that the raw apple diet is a remedy worthy of notice. To quote Birnberg,⁽⁶⁾ it has these advantages:

First it alleviates the symptoms, second, the results are usually lasting, third, it is easily carried out, and fourth, it is safe.

It appears to be one of the greatest advances yet made in the treatment of dysentery.

Acknowledgement.

I desire here to express my indebtedness to Dr. C. Shellshear of this city, who first drew my attention to articles on the raw apple diet which appeared in the foreign literature.

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EARLY DIAGNOSIS OF APPENDICITIS: THE CLINICAL USE OF THE LEUCOCYTE COUNT IN THE PATIENT'S HOME.

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IN the United States of America 25,000 people die annually from appendicitis, the mortality rate being double that of England. It has advanced 50% in twenty years, the "Medical Annual" reports. That the medical profession is deeply concerned is shown by the fact that 2,500 articles on appendicitis have appeared in the medical journals in the last ten years. As a surgical disease appendicitis ranks second in mortality to cancer only.

Grave concern was aroused in England several years ago when it was found that during a period of ten years the fatal cases numbered 28,000 and the majority of the patients were young people, truly a disaster to the nation. A series of articles in the medical Press was written by the most eminent medical men of the time, with consequent advance in knowledge; but always the same conclusion was reached, namely: "for proper treatment to be obtained early diagnosis is the dominating need". Statistics compiled subsequently show that the treachery of this disease is more than ever with us, and the remark made over three decades ago is still true: "Appendicitis is like an old rusty muzzle-loader, it sometimes snaps, it sometimes flashes, and it sometimes explodes, and you never know which it is going to do."

Nevertheless, since then new methods have come into use that often give unmistakable warning of approaching disaster, and one of the most important

of these is the leucocyte count. The use of this at the home bedside may well be classed as an intensive medical service, but it is only by such concentrated effort to obtain correct early diagnosis, and with it the confidence of the patient and relatives, that the best results will be obtained. A quick decision from the relatives will much more easily be obtained if they can be shown the reasoning to follow to make this decision.

A brief statement that the blood is a fluid carrying along two kinds of cells, the red and the white, and that the white ones (leucocytes) increase in number when there is well developed inflammation somewhere in the body, is quickly understood. Many already know something of the blood, having been taught elementary physiology in the schools. And as a final remark, the statement that the normal number of white cells is 7,000 or 8,000 per cubic millimetre and they may rise to 20,000 or 30,000 or more, may be added.

Before discussing the use of the leucocyte count in appendicitis it is necessary to call to mind those diseases that cause no alteration in the number of leucocytes, those that cause a diminution in the number (leucopenia) and those that cause an increase in the number (leucocytosis). The most important of those with no alteration are probably the tuberculous processes, though many of these could be hardly termed acute.

Of those that cause leucopenia an important one is typhoid or paratyphoid. The diminished count here usually appears before the Widal reaction, and for this reason it is important as a diagnostic test. Dengue is another disease in which it is essential to remember the leucopenia, otherwise confusion in diagnosis may occur when the leucocyte count is used in warm climates. To these must be added the very common complaint influenza, the leucopenia occurring in the abdominal type as well as in the other forms.

Of the diseases causing leucocytosis an almost endless list may be compiled, ranging from the general diseases, severe fevers, exanthemata, pneumonia *et cetera*, with their extremely high counts, down to the inconstant low counts seen in types of chronic disease and chronic inflammation, such as that of long-standing pelvic disease. In these conditions the body may have become habituated to the poison and reaction dies down. On the other hand, a similar low count may be seen in severe acute toxæmia where a paralysis of reaction occurs from the overwhelming poisoning, followed later by the production of enormous numbers of leucocytes.

In bone and joint inflammation (non-tuberculous) large counts often occur, that occurring in mastoid disease being a clinical aid to diagnosis of great value, and often a determining indication for early operation by the aural surgeon.

In acute poliomyelitis the clinical use of the leucocyte count may be of value, although large counts do not occur until the second rise of temperature. Early diagnosis in this disease is

imperative, both to protect the community and to save the child from paralysis.

The leucocyte count may be very high in all kinds of acute abdominal conditions, but the greatest benefits from its clinical application have been in appendicitis, with which subject this article principally deals.

Although in some types of appendicitis there may be a very small increase, as in lymphoid hyperplasia of the appendix, in which the average count is about 10,000, with the highest count reaching to approximately 15,000 per cubic millimetre, the typical acute attack, especially in the adolescent, gives very constant results.

Much of the criticism that has been directed against the use of the leucocyte count in appendicitis has probably been due to expecting too much from it. Used circumspectly, it is of great assistance to the doctor, and in actual fact is often a genuine life-saver for the patient. The uncertainty, the anxiety, the worry of cases with pain in the abdomen can usually be cleared away, if not with an immediate decision, at least by the knowledge that one has a guiding line of value. It is not infallible, far from it, as occasional discrepancies show. There are traps and pitfalls to be avoided. Despite these irregularities, it is probable that if a table were to be made indicating the various symptoms and signs of appendicitis in order of constancy of appearance, the increased leucocyte count would be found holding a position high in the list. With pain first in order of frequency, the second place would lie between tenderness and the increased leucocyte count. The remaining features, namely, rigidity, pulse, temperature, general malaise *et cetera*, would rank well after these three in the list of diagnostic guides.

Perhaps the most striking fallacies in cases of suspected appendicitis have been those associated with irritation of the stomach and small bowel. In cases of sudden abdominal pain after dietetic indiscretions counts as high as 30,000 have been seen, but the very intensity of the leucocytosis without corresponding clinical signs has been distinctive.

An illustrative case is that of a woman who had indulged too heartily in a Devonshire tea and other dietetic extras of a department store, the influence of which was helped no doubt by the unhealthy condition of her teeth and gums. In this case the kind of pain, the face, the general good condition and general lack of supporting evidence of appendicitis with so large a count removed most of the anxiety, and the subsequent quick and easy recovery gave confirmation of its being a minor malady.

Colitis may cause a leucocytosis that must be differentiated from that of appendicitis.

For five or six days leucocyte counts were made every day in one of these cases. A count of 15,000 was obtained upon the first examination. It never rose higher and after some days had fallen sufficiently to relieve anxiety. The picture was never truly one of appendicitis; but the leucocyte count gave moral support in combating the persistent agitation of the relatives that the case was one of appendicitis. The passage of mucus and shreds later left the issue beyond doubt.

That leucocytosis is only a very small part of the blood picture of inflammation is quite true, and

much more definite information is obtainable by differential counting, the estimation of the numbers of polymorphonuclear leucocytes, and the displacement to the left of the modified Arneth formula. The formula of Walker also has been used as a guide to the processes of regeneration and to obtain the index of resistance predicting death or complications. But these are for the deliberate and accurate worker in the laboratory.

Time-saving is necessary in leucocyte counting at the bedside; therefore the ability to recognize any error in technique as each step is made will help greatly. Correct measuring of the blood and diluting fluid in the pipette, even distribution of the leucocytes, and accurate size of the drop must be sought at the first attempt. Should there be any error, it must be recognized instantly and the procedure commenced again without delay.

Having completed the count, the next question that arises is: what number indicates the necessity for immediate operation? From consideration of a number of acute cases the boundary line for this was fixed quite arbitrarily at 16,000 per cubic millimetre, but in well defined cases the number is usually found to be higher than this. When the count is considerably below 16,000 in a previously healthy person the inflammation is usually not greatly developed. In any case, if it is within a few thousand of the boundary line, frequent counts are made, as the steady increase in the number is the all-significant feature of advancing inflammation. A count round about 20,000 has been the number most commonly found in acute cases examined soon after the definite onset. It frequently occurs in that well known form attacking the healthy, vigorous, young adolescent of active habit.

World-known instances of this type, ending fatally, readily come to mind: Rudolph Valentino abroad, Barney Keiran, one of Australia's world's champion swimmers, and numbers of others. An instance of the use of the leucocyte count on this type of young adolescent is the following.

A youth, aged twenty years, a wool clerk, who had never been seriously ill before, was examined at 10 a.m. He had suffered pain during the night and had vomited; he had been unable to take breakfast. He had struggled to work, but had soon returned, calling at the surgery on the way home. He complained of feeling "dead crook". There was nothing definite in the symptoms and signs, and there was no rigidity.

Upon very deep palpation he only replied: "Yes, I think it's tender." The leucocyte count was 20,000 per cubic millimetre. As he was a minor, with both parents in the country, a colleague kindly saw the patient. After careful examination the following statement was made by him: "There is absolutely no evidence of appendicitis, except the blood count; is it accurate?"

Arrangements were made for a second count. Result: 21,000 per cubic millimetre.

A decision was made to operate in the early afternoon, when acute inflammation was found in the terminal inch of the appendix. It was red and swollen, approaching the bursting stage. No drain was used. Recovery was uninterrupted.

Frequently in later years almost exact replicas of this case, if the degree of vagueness be excepted, were found in cases sent by other practitioners and

in cases of the writer. In those cases admitted to a public hospital leucocyte counts have always been made first. In this way quick operation has resulted, with benefit both to the patient and to the exchequer of the hospital.

The difficulty of obtaining sufficient data must always make appendicitis to a certain degree a guess; but by more intensive methods of diagnosis it will be less of a guess. An instance similar to that related above is the following.

A message was received by telephone at 9.30 p.m. that a young man had returned home with severe abdominal pain. He had always been well and his relatives were alarmed. A microscope was placed in my car on the off chance of its being needed.

Clinical examination indicated appendicitis. The leucocyte count was 15,800 per cubic millimetre. I arranged to operate early in the morning. At 6.30 a.m. a telephone message was received that it had been decided to call in a consultant from the city. This was arranged for the middle of the morning. In the meantime the leucocyte count had advanced to 18,500. By the time of the consultant's arrival the quiescent deceptive stage that has led to many deaths had been reached. After examination the consultant expressed the opinion that the patient should be carefully watched during the next few days. Upon being informed that the leucocyte count was 18,500 and rising, he made the decision at once to operate in the afternoon.

The appendix was found distended in its terminal part, highly inflamed, œdematous and well on towards rupture. No drain was used. Recovery was uninterrupted.

Here we have two factors that often recur, militating against the chance of the patient. Despite the usually convincing effect of a blood count upon the patient and relatives and the added confidence that the doctor has in his diagnosis, enabling a firmer opinion to be given, the blow of impending operation was too great. The natural caution of educated people suggested further investigation before so grave a matter as operation could be accepted for a boy who had never been seriously ill before. When the consultation was held, the true condition was completely disguised. Valuable time had already been lost, and without the help of the leucocyte count still more would have been lost, for to temporize appeared the wisest course upon the data available.

Events like this must often occur, but who can blame the relatives of a hitherto healthy, active boy for lack of decision when struck the sledge-hammer blow of "immediate operation"?

A somewhat different case is the following:

A young man of exceptional development and strength suffered pain across the abdomen above the navel while returning from a motor trip. He made himself vomit. He had a chilly feeling. The temperature was 37.5° C. (99.5° F.), pulse rate 80 per minute, and the leucocyte count 14,000 per cubic millimetre. The next day the pain had left the mid-abdomen and centred in the right iliac region; but it was hardly a pain now, more a soreness. He was now feeling much better; he had slept well and had had a light tea and breakfast. The temperature was 36.8° C. (98.2° F.) and the leucocytes numbered 11,000 per cubic millimetre. On the third day the number of leucocytes had fallen to 8,000 per cubic millimetre. There was still a sore feeling in the appendix region.

On the sixth day, at the patient's request for a city surgeon, I gave him a letter stating that he had suffered from appendicitis which had now quietened down. After he had arranged some business matters, the patient under-

went operation on the fifteenth day after he had been first seen. The appendix was found sharply kinked about the middle. The terminal portion was enlarged and there was a blue discoloration on one side where the inflammation had been. The wall was thinned, partly necrosed and unhealthy-looking. The contents comprised dark, clotted, blood-stained fluid.

Disaster was undoubtedly threatening this young man. Afterwards he stated that his illness before operation had really caused him very little pain or trouble and he would have returned to his station property without consulting anyone else but for the impression made upon him by the leucocyte count and the warning that operation might be needed at any time. As he was in a comparatively isolated part, with the nearest doctor many miles away, the risk he would have run is obvious.

The unscientific and quite arbitrary method of taking the count of 16,000 leucocytes per cubic millimetre as a boundary line is an attempt to reach farther in diagnosis than is attained by the two points laid down by an eminent authority as sufficient to determine operation, namely: "first, general abdominal pain, second, local tenderness, and in you go".

While surgeons of high reputation by the expression of their opinions alone may be able to satisfy the patient and relatives of the necessity for urgent operation, the general practitioner will find many pertinent questions put to him that he has to answer satisfactorily to overcome the fatal temporizing before operation. With the moral and practical support of the leucocyte count his position is much stronger. When it becomes part of the stereotyped examination for appendicitis and occupies a position comparable to that of examining the heart before an anæsthetic, a definite improvement in the mortality figures for appendicitis may be expected to follow.

COLONIC DIVERTICULITIS.¹

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ALTHOUGH isolated cases of diverticula or sacculi of the colon have for a century or more been recorded in medical literature from time to time, it was not until thirty-five years ago that Graser first emphasized the frequency and significance of this disorder.

Since that date illuminating papers have been published, amongst others, by W. H. M. Telling and O. C. Gruner, Hamilton Drummond, J. P. Lockhart-Mummery, Lord Moynihan, L. R. Fifield, E. I. Spriggs, W. J. Mayo, and J. T. Case.

Yet today one is justified in stating that complete recognition has not yet been accorded this malady, for neither has it been given that place in the current text books of medicine and surgery which its frequency and importance demand, nor has it entered fully into the clinical consciousness of the general medical practitioner.

In the era before X rays these pouches were generally overlooked, even by experienced pathologists, for they are generally small in size and usually embedded in fat or buried as a result of inflammatory changes in adjoining tissues. Modern radiography has, however, demonstrated that not only are these diverticula present in 5% to 10% of all persons over forty years of age, but their development has been witnessed in portions of the colon previously healthy. A study of sex incidence shows that approximately 65% of the cases occur in the male sex.

The pouches tend to form where blood and lymph vessels pierce the wall of the colon, that is, at the alleged weakest part, and to appear on the peritoneal surface near to, but not at, the tænia. They are usually multiple and tend to occur in two rows. In size they vary from microscopic dimensions to the size of a hazel nut, a very usual size being that of a large pea or less. Several hundreds have been reported to exist in the same colon.

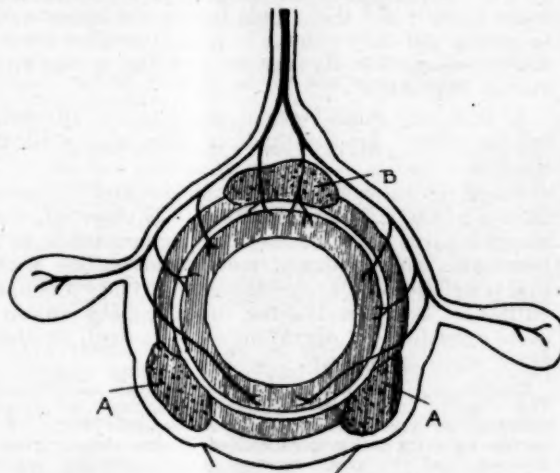


FIGURE I.
Diagram to show muscle coats and blood vessels of pelvic colon (after Hamilton Drummond). a = lateral longitudinal, b = mesocolic bands.

The ætiology of diverticulosis or prediverticular stage is as yet unknown, but their incidence in middle age points to the pouches being acquired rather than congenital. Further, their occurrence in localized segments of the bowel suggests a local disease rather than any mechanical cause.

The disease is frequently associated with infective foci, whether casually or causally, in other parts of the body, especially foci in the teeth, and with arthritic changes in the spine, usually the lumbar region.

The obese, middle-aged, fleshy person with whom one is accustomed to associate gall-stones, if the patient is a female, is the type predisposing to diverticulosis.

Two main theories are in vogue to explain the origin of the pouches.

The first is that degenerative changes take place in the musculature and pouching of the mucous

¹ Read at a clinical meeting of the staff of the New South Wales Community Hospital on April 26, 1933.

membrane tends to occur through weak points in the colonic wall, such as holes to transmit blood and lymph vessels or other muscular defects. That these diverticula are not simply passive herniae through atrophied muscle is shown by the fact that the pouches are not met with in the thin-walled atonic and atrophied colons of colonic stasis.

The second theory is that slight inflammatory changes cause relaxation of the bowel wall, so that intracolonic pressure produces small herniae of the mucous membrane through the weakened muscle (E. I. Spriggs).

It is interesting to note that in the present series a history of colitis preceded the onset of symptoms in 16% of cases.

Sir Arthur Keith's suggestion was that an irregular sustained contraction of the musculature, especially of the longitudinal bands, preceded the formation of the pouches. The same writer argued that the walls of the colon were thrown into circular folds somewhat after the manner of a concertina, and so deeply did these folds invade the lumen and so closely did they come into apposition that a forward passage for the contents of the colon was almost impossible.

At first only small areas of the colon are affected, but the morbid process tends to creep slowly along the bowel wall.

When the colon is viewed radiographically, rarefaction of the circular musculature is observed, the affected area loses its normal segmentation and presents a narrowed and more rigid outline with characteristic small corrugations (concertina-like outline). Seymour Barling described the appearance presented at operation in a patient at this early stage as follows:

Laparotomy was performed under spinal anaesthesia. The sigmoid colon, on examination, showed no gross changes, no sacculi, no excessive deposit of fat, no narrowing. Its walls were rather thicker than normal, however, and the areas between the longitudinal bands showed a peritoneum that was distinctly injected and a little edematous.

While under examination a most extraordinary sequence of events occurred which, in my experience, is quite unique. At one point the bowel suddenly narrowed to half its previous diameter; this narrowing spread up and down for three or four inches, the bowel in this area becoming the size of the index finger and quite as firm. It was so rigid that it resisted flexion like a string of large beads very tightly threaded.

While the spasm lasted many tiny sacculi appeared between the longitudinal bands; these were each segments of a circle about a third of an inch or less in diameter and lay regularly like beads along the sides of the gut.

In a few seconds the spasm passed off and a nearly normal bowel remained with faint evidence of the tiny projections indicated for a few seconds by the altered blood supply at their sites owing to the tension to which the peritoneum had been subjected.

The cycle of spasm repeated itself thrice during the time the abdomen was open.

Subsequently the mucous membrane herniates at weak places through the muscle wall to form little pockets, the gradual enlargement of which appears to depend directly upon raised local intracolonic pressure originated by contractions of the proximal part of the colon.

Serial films show that diverticula become filled as a rule during the period of inhibition and empty themselves during contraction.

The physiological stasis of the sigmoid colon would appear to be the determining factor of the location of four-fifths of the cases of diverticula in this segment of bowel.

To sum up, diverticulosis is a relatively frequent condition of unknown origin, consisting of herniation of the mucosa and rarely manifest by any symptoms.

Diverticulum formation being accepted, the phenomena associated with acute or chronic inflammation become pathological possibilities.

Pathology.

Diverticulitis, which arises in some 12% to 16% of cases of diverticulosis, is a definite and serious disease, characterized by inflammation of one or more diverticula. Faecal retention, combined with the presence of microorganisms, leads to infection, and the secondary inflammatory reaction spreads not only throughout the involved segment of bowel, but also to the adjacent mesocolon (mesosigmoiditis).

As already pointed out, the maximum number of cases involve the sigmoid loop.

In Masson's series the site of the disease was as shown in the accompanying table:

Site.	Number of Cases.	Percentage.
Caecum	5	4.31
Transverse colon .	3	2.58
Descending colon .	5	4.31
Sigmoid	94	81.03
Rectum	5	4.31
Not located	4	3.44

My experience agrees with that of those who find diverticulitis comparatively uncommon amongst the industrial classes: only two of my cases were seen in public hospital.

The tendency of the pouches to become filled with and to retain faecal material not only furnishes the leading characteristic of diverticulitis, but is also the basis of both clinical and pathological features.

In an early case of diverticulitis the pouches contain faecal material, which, even though not filling the whole lumen, can be emitted therefrom only with difficulty.

The subserous layer becomes loaded with fat, which frequently obscures the pouches. The walls of the diverticula are inflamed and present imperfect obliteration or stenosis of their necks. It therefore follows that, owing to the ease with which they empty, large pockets (with wide necks) are not nearly so harmful as the smaller, less obvious pouches with narrow necks.

In the presence of faecal impaction, auto-infection takes place and the inflammatory changes progress.

At a later stage the diverticula are full of faecal material of varying degrees of hardness and inspis-

sation—often actual stercoliths are present—which cannot be evacuated owing to obliteration of the neck of the pouches (obliterative sigmoido-diverticulitis).

If acute inflammation supervenes, perforation and peritonitis may result, or a local abscess may form and be complicated by fistula formation with neighbouring viscera.

On the other hand, with chronic inflammation or peridiverticulitis a low grade hyperplastic reaction will frequently give rise to stenosis or to the formation of a mass simulating newgrowth.

Symptoms.

The inflammation, once started, thickens and contracts the haustra and gives rise to characteristic symptoms and radiological features.

The clinical features, those of a low grade inflammation of the colon, have been described in detail by E. I. Spriggs, and I shall take the liberty of epitomizing his account. Recurrent attacks of abdominal discomfort, less often pain, not as a rule related to food, occur, which discomfort is situated in the lower part of the abdomen, about or below the umbilicus, but more especially in the left iliac fossa.

General flatulence and a feeling of distension are usually mentioned. Constipation, irregularity of the bowels, diarrhoea and a sense of incomplete evacuation are frequent symptoms. A long-standing history of alternating constipation and diarrhoea with left-sided colicky pain is very suggestive (Dunn).

Tenderness elicited by palpation and usually accompanied by more or less definite muscular rigidity is an extremely frequent symptom.

Except in obese subjects, a tender sausage-shaped tumour, frequently varying in both size and consistency, can generally be felt either in the left iliac fossa or bimanually through the rectum or vagina.

Leucocytosis associated with irregular attacks of a moderate degree of pyrexia is commonly present.

CASE I.—A well nourished male, aged fifty-one years and weighing 75.6 kilograms (twelve stone) had complained of two attacks of pelvic backache or sacral ache during the past six weeks. The present attack of one week's duration was characterized by a dull, aching, bruised feeling, which on defecation was varied by an acute lancinating pain shooting through to the hypogastrium.

The bowels were in the habit of acting regularly without medicine, but mucus was frequently present in and on the motion. He had been operated on for hæmorrhoids and (?) two fissures *in ano* in 1918 and had had an attack of *herpes zoster* involving the distribution of the right sciatic nerve in 1921.

The temperature was 37.2° C. (99° F.), the pulse rate 88, and the iliac colon formed a tender sausage-shaped tumour in the left iliac fossa.

The radiological report dated April 4, 1924, read: "Skiagrams herewith show a definite section of the colon affected by diverticulitis."

The patient was advised to lead a "paraffin life" and to indulge in a diet of a vegetarian nature.

When he was examined a year later no tenderness or swelling could be detected in the left iliac region.

The patient wrote on March 30, 1933: "Apart from two or three twinges at different times there has been no recurrence whatever of the trouble."

CASE II.—An oversized man, aged fifty-four years, who had always lived in New South Wales and who was considerably over-weight (111.6 kilograms or seventeen stone ten pounds), was referred by his local practitioner for suspected pyelitis.

For the last year he had been complaining of a dull aching pain in the left iliac region which, although relieved by defecation, was intensified by partaking of food. The pain gradually became worse as the day progressed, and at night prevented him from lying on his right side.

For the last twelve months he had been having one, two or three evacuations of the bowels within half an hour of each meal, passing small, frothy, pultaceous, light yellow stools containing much mucus.

On examination the temperature was 37° C. (98.6° F.), the pulse rate 100, and an indefinite tender mass could be felt in the left iliac fossa. The pathological report read:

Urinalysis: Reaction acid, colour pale amber, specific gravity 1008, slight cloud of albumin, no sugar, no casts, deposits three or four pus cells per field and few epithelial cells, cultures about ten colonies of staphylococci present.

The radiological report dated August 19, 1925, stated:

There is no calculus shadow in the left renal tract. The opaque enema flows freely to the caecum without obstruction and shows some narrowing of the descending and sigmoid colons, with some small diverticula.

Appendicostomy was recommended, but the patient sought further medical advice and was advised against surgical interference.

The widow wrote on March 28, 1933, stating:

He was not too bad from the time he consulted you (just now and then feeling unwell and a great pain in his left side) until about six months before his death. However, he got very sick before Xmas, 1928, and could not eat, so he consulted another doctor, who ordered an X ray, before he could get it taken he had a very bad hæmorrhage [hæmatemesis]. Six weeks later he came home from hospital and had a recurrence of the hæmorrhage. He gradually got worse and died in March, 1929.

The main symptoms of this last illness being anorexia, hæmatemesis and wasting (December, 1927, 102.1 kilograms or sixteen stone three pounds, and December, 1928, 73 kilograms or eleven stone six pounds) would point to *carcinoma ventriculi* as being the cause of death.

CASE III.—A salesman, aged thirty-three years, had been complaining for the last three weeks of a continuous dull ache in the epigastrium, varied by sharp, stabbing exacerbations of from two to six hours' duration, coming on about twice a week. The bowels were in the habit of acting regularly without the aid of aperients. On examination the temperature was normal, the pulse rate 80, and a localized area of tenderness was present at Mayo Robson's point. The radiographic reports, dated August 29, 1929, stated:

Gall-bladder emptied normally. No abnormality was detected. Stomach and duodenum regular. Appendix fills well. Colon: numerous small diverticula appear to be present in the transverse colon.

The patient was advised to indulge in the paraffin habit and to partake of a diet of a vegetarian nature.

A report from the patient, dated March 30, 1933, states:

I stayed on the diet for a long time, but am not on it now. The trouble got right, but my back got pretty bad rheumatism. I pretty well cured that either with "Sal Vital" or Fisher's "Kil-Rhu".

CASE IV.—A male, aged fifty-five years, complained that for the last seven years he had been subjected to attacks of a constant dull aching pain, coming on about every three months and lasting for approximately three weeks.

The bowels were in the habit of acting regularly without the aid of medicine. On examination the temperature was

found to be 37.4° C. (99.4° F.), the pulse rate 72, and a localized area of tenderness was present at the junction of the middle and outer thirds of the bispinal line on the left side.

The radiographic report, dated March 18, 1927, read: "There is diverticulitis of the sigmoid colon with some narrowing."

The patient, who was placed on the customary medical treatment, wrote eight months later to the effect that as he had no symptoms he did not see the point of having a further X ray examination made to estimate progress.

Maxwell Telling, W. J. Mayo and others have endeavoured to group all cases of diverticulitis under four or more distinct clinical heads, but these types merely represent the "end results" in cases that for months or years have exhibited the symptoms described above and hence must be regarded merely as subgroups of the main type. Although the acuteness of inflammation in the walls of a diverticulum may vary in intensity, the end results must necessarily be one of the four recognized terminations: resolution, fibrosis, suppurative or necrosis.

A. Acute Diverticulitis (5%).

All the familiar phenomena of subacute appendicitis are reproduced in the left instead of the right iliac fossa.

Tenderness in the left iliac fossa or just above the pubes is a very definite and characteristic sign. Even the lightest pressure causes the patient to flinch and a very definite spot of acute tenderness will usually be readily located.

As a rule the symptoms are not severe, and although the temperature may be elevated one or two degrees, the patient is usually convalescent within ten days, the tumour regressing to average size within a month.

Just as on rare occasions the pain and symptoms of acute appendicitis may be referred to the opposite side, so, but with much greater relative frequency, acute diverticulitis may occur with right-sided symptoms. The disease then becomes indistinguishable clinically from acute appendicitis.

CASE V.—A thick-set man, aged fifty-two years, was first seen in consultation on January 25, 1933, for threatened intestinal obstruction.

For twenty-four hours he had been ill with fever, abdominal distension and severe colicky pains located in the lower part of the abdomen. The bowels were in the habit of acting regularly without the patient resorting to aperients and, although on the previous day but one there had been two evacuations (8 a.m. and 9 p.m.), he had failed to pass faeces or flatus for twenty-four hours.

The temperature was 38.1° C. (100.6° F.), the pulse rate 104, and a moderate degree of abdominal distension was present.

On examination a large, exquisitely tender, indefinite mass could be felt in the left iliac fossa. A soap and water enema gave rise to a copious evacuation.

The radiological report read:

The whole of the descending colon appeared to be very spastic and irritable. The fluoroscopic examination and skiagrams showed three small diverticula protruding from the lateral aspect of the descending colon at its junction with the sigmoid colon. This region was very tender, even on light palpation.

Appendicostomy was refused, the patient preferring to pin his faith to paraffin and colon douching.

When last seen, on March 27, 1933, except for "rheumatic pains" in both shoulders and back, the patient felt perfectly well. No mass or tenderness could be detected in the left iliac fossa.

B. Peridiverticulitis or Hyperplastic Stenosing Type (15%).

Peridiverticulitis closely simulates carcinoma of the colon.

Infection of a number of more or less closely aggregated diverticula originates a chronic proliferative inflammation, leading to thickening and subsequent stenosis of the bowel.

The characteristic symptoms are increasing constipation and recurrent attacks of colic associated with abdominal distension. The obstruction is usually recurrent, partial or subacute, and the final stage of repeated warnings.

In other words, it differs from a ring carcinoma in that when the inflammatory mass is removed and laid open the obstruction will be rarely found to be complete. In fact, it is remarkable how seldom diverticulitis gives rise to complete and fatal obstruction.

CASE VI.—A man, aged forty years, and weighing 97.2 kilograms (fifteen stone six pounds), was referred by his local practitioner who wrote that the patient had had two attacks of abdominal pain, accompanied by tenderness, localized to the junction of the outer and middle thirds of the bispinal line on the left side and pyrexia during October, 1922, and again in September, 1923.

On the second occasion a mass the size of a hen's egg could be felt deep to the infraumbilical portion of the left rectus muscle; the mass was believed to be an appendiceal abscess. Laparotomy was performed, a retrocaecal appendix was removed, and the mass on examination was found to be located in the mesosigmoid. On examination on November 15, 1923, a mobile tender mass, the size of a large orange, could be felt just below and to the left of the umbilicus. The radiological report, dated November 16, 1923, read as follows:

Enema flows to the sigmoid without delay. There are multiple diverticula of the sigmoid colon and there is a contraction of the sigmoid, as shown in skiagrams, which is probably spastic contraction. We could not exclude newgrowth as the cause of this contraction.

Temporary valvular caecostomy was performed, Senn's method being used, and a number 10 Jacques catheter was inserted into the caecum.

The mass was found to involve the lower sigmoid and to be firmly hitched up to the sacral promontory by a greatly contracted and thickened mesosigmoid.

The patient returned to the country with an injunction to irrigate the colon twice a day with saline solution and to return in nine months' time and have the position reviewed by radiological examination.

On the evening of March 9, 1924, the catheter fell out and attempts to replace same at a district hospital failed.

When the patient was examined on March 20 a free discharge of offensive pus was emerging from the sinus, and considerable induration could be felt in the deeper planes of the abdominal wall. An opaque enema flowed freely to the caecum without obstruction, but the sigmoid still showed marked diverticulitis. The patient was advised to lead a "paraffin life" and indulge in a diet of a vegetarian nature.

On May 24, 1932, he presented himself with an incisional hernia, the size of a hen's egg, at the caecostomy opening. The hernia was repaired at the New South Wales Community Hospital on May 26, 1932, when exploration by palpation revealed an apparently normal sigmoid colon.

CASE VII.—A large-framed married woman, aged forty years, and weighing 67.5 kilograms (ten stone ten pounds), was referred by her local practitioner on September 2, 1925, on account of intractable "dysentery" of six weeks' duration.

Tenesmus, a constant burning pain referred to the anus, and the passage each day of six to eight loose stools, consisting largely of blood-stained mucus, were the chief symptoms.

Three weeks previously the *sphincter ani* had been stretched at a country hospital, but this failed to give any relief. The bowels had always been troublesome and the patient had been in the habit of taking six cubic centimetres (one and a half fluid drachms) of cascara every night. Perineorrhaphy had been performed in 1914 and appendicectomy for relapsing appendicitis in 1922, the latter being complicated by post-operative femoral thrombosis.

The patient, the subject of maternal visceroptosis, presented a tender and palpable iliac colon, and on bimanual examination a tender tumour, the size of a hen's egg, could be felt lying behind the uterus on the left side. Sigmoidoscopic examination revealed a red, inflamed, injected mucous membrane presenting about a dozen small superficial follicular ulcers.

The radiographic report of September 4, 1925, read: "Diverticulitis of the sigmoid colon; there is no obstruction to the enema."

A cellulose-free diet, liquid paraffin, and irrigation of the colon (not rectum) with weak solutions of albuminate of silver freed the patient from her symptoms and enabled her to resume her ordinary life.

By March, 1926, the only symptom complained of was a dragging pain in the lower part of the abdomen on walking about.

The report following a progress enema, administered on November 30, 1926, read:

The appearances of the sigmoid show some evidence of chronic inflammation, and there is a diverticulum of the descending colon at the site marked in the skiagram. The appearances are much more healthy than on the previous examination.

About June, 1928, she was in a metropolitan hospital for six weeks undergoing treatment for "anxiety neurosis"; the colon was not tender nor could any pelvic mass be detected.

She was last seen on March 23, 1932. Her symptoms then were gastric, practically constant heartburn and epigastric pain coming on immediately after each meal. No occult blood was present in the stools.

The report on the barium meal, dated March 29, 1932, read:

There is a little spastic irregularity of the pyloric third of the stomach. There was no evidence of ulcer crater, although the spasticity may represent a pre-ulcerative condition.

The patient wrote on April 5, 1933, stating:

I am pleased to let you know the pain in the left side has not recurred or caused me trouble except for a slight twinge about ten months ago.

CASE VIII.—A well-built, elderly man, aged seventy years, and weighing 75.6 kilograms (twelve stone), was admitted to the State Hospital on October 26, 1932, complaining of "rheumatics from head to toes" and colicky pains, chiefly on the left side of the abdomen, which had been griping him about every half hour for the past five or six weeks. The appetite was poor and he had lost a stone in weight in the last month.

The temperature was 38.1° C. (97° F.), the pulse rate 80, and a hard, contracted, tender "gas-pipe" colon could be felt in the left iliac fossa.

The radiographic report, dated November 1, 1932, read as follows:

Enema flowed freely and outlined all bowel as far as caecum. The rectum appears to be unusually narrow. There is a filling defect in the pelvic colon. This portion of the bowel is irregular in outline, the walls being broken by star-shaped projections. I consider the lesion in the pelvic colon is due to multiple diverticulitis.

Appendicectomy was performed on November 2, 1932, and the patient advised to follow a vegetarian-like régime and to ingest paraffin.

The colon was irrigated through the appendicostomy catheter with 2.2 litres (half a gallon) of hazelene solution (14 grammes to a litre or two drachms to a pint) once or twice daily for three months.

The report of a progress enema administered on January 23, 1933, was that in the sigmoid region the colon was irregular and the outline pointed. It was thought that the appendicostomy tube might be removed.

On March 11, 1933, as the appendicostomy sinus had been soundly healed for over a month and there had been no abdominal symptoms, the patient took his discharge from hospital.

C. Perforation of a Diverticulum (35%).

Acute inflammation involving a diverticulum and associated with perforation or gangrene results in either a diffuse spreading (18%) or a localized (17%) peritonitis.

The symptoms of the former will be those of a diffuse peritonitis, of sudden and unexpected onset, added to those of a preexisting diverticulitis.

As the tip of an intrasaccular concretion often projects slightly into the lumen of the bowel, it is not surprising that several cases of sudden (pistol-shot) perforation have occurred whilst the patient was straining at stool or as a result of sudden trauma.

Owing to local peritonitis, a diverticulum which is about to perforate is frequently shut off by adhesions so that a local abscess, often small and latent, is formed. Usually, however, abscess formation leads to tumour formation, pyrexia and leucocytosis. If untreated, the abscess tends to discharge, with the formation of sigmoido-vesical, sigmoido-intestinal, sigmoido-cutaneous or other fistula.

The sudden disappearance of both tumour and symptoms owing to spontaneous evacuation through bowel or other viscus has been stressed by Stengel.

CASE IX.—For two years an obese married woman, aged sixty-five years, had suffered from severe constipation, a week frequently elapsing between successive evacuations, but since an operation for hæmorrhoids one month previously a daily action had been secured by the aid of suitable aperients.

For seven days a constant dull ache had been present in the left iliac region, which for the last three days had been intensified by frequent severe cramps. Intense hypogastric pain had been present for ten hours, but, although the patient was nauseated, there had been no actual vomiting.

She was admitted to hospital fourteen hours after the onset of acute pain; her temperature was 38.9° C. (102° F.), the pulse rate 120, and the customary signs of an acute peritoneal infection of the lower abdominal type were present. An indefinite mass, the size of a hen's egg, could be felt in the left iliac region.

Left infraumbilical pararectal celiotomy disclosed a diffuse lower abdominal peritonitis. The tænie of the upper pelvic colon could not be identified owing to deposits of subperitoneal fat and the bowel being studded with innumerable appendices epiploicae, all of which were congested, oedematous and greatly indurated. The pelvic mesocolon, shrunken to about 5.0 centimetres (two inches) in length, was also thick, oedematous and injected. The upper part of the pelvic loop presented on its antimesenteric surface a mass, the size of a hen's egg, composed of inflamed and gangrenous fat surrounding a deep crater-like ulcer exuding a black, stinking discharge.

Owing to the oedematous and indurated state of the tissues, suture of the perforation, even with the aid of an omental graft, proved to be impossible.

Since colostomy would also have necessitated extensive mobilization of the sigmoid, the affected portion, some 12.5 or 15.0 centimetres (five or six inches) in length, was removed, the ends were closed and the continuity of the bowel was restored by lateral anastomosis. The

peritoneum was cleansed and operation completed by the insertion of a drainage tube through a stab wound into the depths of the pelvis.

When the excised bowel was laid open the orifices of three diverticula were detected, one of which had perforated and opened directly into the crater of necrotic pericolic fat. Four months later the patient was well and having two normal actions of the bowels daily.

D. Pelvic Syndromes (7%).

Inflammatory processes originating in one or more diverticula may spread to and involve adjacent pelvic viscera and give rise to the formation of an inflammatory mass or adhesions within the pelvis.

In other words, not only is a small proportion of the cases of pelvic inflammation directly due to diverticulitis, but this minority is not infrequently characterized by the clinical symptoms and picture of a gynaecological rather than of an enterological condition.

Giffin, in a series of thirty-nine cases, mentions four patients (all women) in whom there existed pelvic masses without any bowel symptoms.

CASE X.—An unmarried woman, aged thirty-five years, came for examination in October, 1929, stating that a left salpingo-oophoritis had been alleged to be the causative "focal sepsis" of various maladies from which she had been suffering for the past two years. In August, 1927, she had an attack of subacute colitis and was confined to bed for a fortnight. Since that date there had been irregular bouts of pyrexia, coming on about every month and lasting for five to ten days. Towards the end of 1928 tachycardia and a subnormal blood pressure were noticed and the bouts of pyrexia became associated with severe headaches, fibrositis and fainting attacks.

The specific gravity of the urine varied throughout from 1025 to 1030 and, except for a trace of albumin, the urine never presented any abnormal constituents.

The radiographic reports of January, 1928, stated that no dental sepsis was present. Dulness was found in the right sphenoidal and right ethmoidal regions. The right frontal sinus was absent. In the sacro-lumbar region no bone lesion was demonstrated on stereoscopic examination. After an opaque meal no organic gastro-intestinal lesion was demonstrated. The appendix was long. No tenderness was found on palpation in this region.

During August and September, 1929, she was under treatment in hospital for acute or subacute rheumatism involving both wrists, both ankles and both hips.

On examination the temperature was 37.1° C. (98.8° F.), the pulse rate was 100, and definite tenderness was present in the left quadrant of the pelvis.

Microscopic examination of the faeces revealed red cells and very numerous pus cells. A great deal of mucus was present. No ova or parasites were seen. Culture of the faeces yielded streptococci and *Bacillus coli communis*; cultures through the patient's blood yielded streptococci in pure culture.

The radiographic reports read:

No obstruction to flow of enema. There is a single diverticulum near the pelvi-rectal junction. Both uterine tubes are patent.

An appropriate diet, the paraffin habit and a course of pathogen-selective vaccine, prepared after the method of Solis Cohen, terminated the illness.

CASE XI.—A well-nourished married woman, aged forty-nine years, and weighing 67 kilograms (ten stone nine pounds), who paid her second annual visit to the New South Wales Community Hospital on January 19, 1933, was referred from the gynaecological department with a two years' history of attacks of gripping pains in the left iliac region, coming on about every two months and lasting for approximately three days. These attacks were associated with backache, diarrhoea and pyrexia.

At twenty-three years of age an ovary had been removed, and in 1930 the cervix uteri had been amputated and colpo-perineorrhaphy had been performed for the relief of uterine prolapse and cystocele.

The temperature was 36.1° C. (97° F.), the pulse rate 104, and tenderness was present in the left quadrant of the pelvis.

The radiographic report, dated February 24, 1933, read:

A small diverticulum can be seen in the sigmoid; in addition, there is some irregularity and narrowing of the sigmoid just above the rectum, possibly inflammatory, possibly newgrowth.

The patient was advised to secure a bi-daily action of the bowels by the aid of paraffin and a diet consisting largely of fruit and vegetables.

Radiological Examination.

Films should be taken with the patient in the right and left oblique positions as well as in the customary postero-anterior position.

In the early stages the haustral indentations, instead of being placed opposite one another, alternate on either aspect of the bowel, and secondary smaller indentations arising from swollen mucosal folds produce rounded or serrated inopaque intrusions into the barium-filled lumen. Later the haustral indentations, in addition to being spaced irregularly, become deformed, contracted and irregular in outline, thus giving rise to the spike-like or palisade-like projections from the bowel lumen. This corresponds to the stage of thickening of the bowel wall.

The final stage of filling defect originates through the thickened wall encroaching upon the lumen of the bowel and giving rise to stenosis, which, unless treated, will eventually lead to subacute or chronic intestinal obstruction.

In addition, the typical rounded oval or crescentic extramural pockets indicative of diverticula will usually, though not always, be visible in adjacent segments.

Owing to the presence of extraluminal residues the diverticula are frequently more apparent subsequent to evacuation of the barium-filled colon.

The effectiveness of treatment may be readily gauged by means of the opaque enema.

Diagnosis.

The diagnosis of diverticulitis is not difficult, provided the comparative frequency of the disease be kept in mind. More can be learnt about a given case by a combined clinical and X ray examination than by either a laparotomy or a *post mortem* inspection.

The chief errors are to diagnose diverticulitis because some diverticula are seen, and to miss diverticulitis because the involved segment is hidden behind a loop of sigmoid flexure.

The sigmoidoscope has been extremely disappointing as regards affording positive data; it may show the distal aspect of a stricture devoid of the nodules which accompany a carcinoma.

In distinguishing diverticulitis from carcinoma a long history of capricious action of the bowels, irregular pyrexia, especially an elevation of temperature to 37.2° or 37.8° C. (99° or 100° F.) or

more, a moderate degree of leucocytosis, and an absence of blood (the mucosa is seldom involved in diverticulitis) are often of value.

On the one hand it must be remembered that carcinoma occasionally originates in a segment of bowel, the seat of diverticulitis. In Dr. W. J. Mayo's series 31% of patients had developed carcinoma following on preexisting diverticula.

It has been suggested that irritation and inflammation of the pouches furnishes a special predisposition to the development of carcinoma. On the other hand, it is common knowledge that diverticula are very rarely seen above the site of disease in cancer of the colon.

Rovsing's sign is of value in distinguishing sigmoido-diverticulitis from appendicitis with left-sided symptoms.

In all cases of "left lower quadrant" and pelvic inflammations, especially those occurring in women over thirty years of age, diverticulitis should be considered in the differential diagnosis. Further, radiography must be regarded as the only reliable means we possess of making a definite diagnosis.

CASE XII.—A widow, aged sixty-six years, was first seen on June 17, 1924, on account of recurrent attacks of pain in the left iliac fossa; six months previously a "stitch" had lasted twenty minutes; three months previously a dull ache had persisted for a week; a bearing-down pain had been present for the last three weeks coincident with a frequent desire to go to stool.

The bowels had always been troublesome and a bi-weekly action could be secured only by taking an ounce of Epsom salts twice a week.

On bimanual examination a tender mass the size of a cricket ball could be felt lying in the left quadrant of the pelvis.

The radiographic report, dated June 26, 1924, read:

Obstruction at pelvi-rectal junction. It is not possible to say whether this is due to a newgrowth or to inflammatory change. The presence of a diverticulitis of the sigmoid colon rather favours the latter.

Sigmoidoscopy for the purpose of removing portion of the growth for confirmatory section was refused.

Although a daily action of the bowels could be secured by the aid of paraffin, the pelvic mass continued to increase in size and the body weight progressively fell at an approximate rate of 0.67 kilogram (one and a half pounds) per week. Colostomy was performed in October, 1924, for chronic intestinal obstruction. A secondary peritoneal deposit showed the microscopic structure of an adenocarcinoma undergoing colloid degeneration.

The patient gradually went down hill and died on March 31, 1925.

Treatment.

If diverticulitis is detected before serious septic complications have arisen and whilst the disease is still confined to the intestinal wall, most patients can be restored to good health by purely medical measures.

It should be remembered that for efficient functioning of the colon the colonic contents should be maintained in a soft condition. If more than 80% of the water is absorbed, the colon is unable unaided to expel its contents and the voluntary muscles are called in to assist.

Non-operative treatment consists in keeping the colon in as clean and as healthy a condition as possible. Lavage of the colon with saline solution

should be carried out either daily or on alternate days. The fluid must be run in at low pressure, the funnel being not more than eighteen inches above the level of the anus, otherwise spasm is liable to be provoked.

The diet should be simple, regular, and consist largely of fruit, vegetables and coarse cereals.

The bowels should be kept acting regularly by diet, paraffin, and the creation of a daily "habit time".

Olive oil enemata, 90 to 180 cubic centimetres (three to six fluid ounces) of warm oil to be retained all night, are sometimes useful, but regular purges should at all cost be avoided.

When diverticulitis is firmly established, colon lavage must be continued for months on end; hence appendicostomy becomes the method of election, treatment then being more efficient and capable of self-administration.

The progress under treatment may be gauged both by the clinical state and by opaque enemata. If the lumen of the bowel is becoming narrower, operation should be undertaken before intestinal obstruction supervenes.

When acute diverticulitis has arisen, short of definite abscess formation, omentum may be drawn down and stitched all round the inflamed area so as to seal it off from the general peritoneal cavity and prevent other viscera from becoming adherent to it. At the same operation appendicostomy should be carried out, so that regular colonic lavage may be instituted. Under these measures the acute inflammation usually subsides with surprising rapidity.

Transverse colostomy recommended by certain authorities in the Old Country is, in my experience, generally contraindicated.

The inflammation may terminate in fibrosis so excessive that an impermeable stricture may result, necessitating either a permanent artificial anus or resection of the damaged portion of the bowel if the colostomy is to be closed.

Four complications demand surgical treatment: perforation of a diverticulum, suppurative pericolicitis sinistra, fistula, or subacute or chronic intestinal obstruction.

When perforation with early general peritonitis has occurred, although British proctologists advocate colostomy performed well above the perforation (usually a transverse colostomy) combined with abdominal drainage, the Australian neophyte considers the first three steps of Devine's modification of the Mickulicz-Paul resection in conjunction with adequate abdominal and pelvic drainage a safer and sounder procedure.

Simple abdominal drainage has led to recovery in a few cases, but this method is unlikely to be successful unless the perforation be extremely small.

Satisfactory closure of the perforation, even by the aid of omental grafts, is usually out of the question, as the surrounding oedema and induration prohibit accurate stitching.

If a definite abscess forms, the pus should be drained without waiting for spontaneous evacuation, as the latter course tends to lead to the formation of a fistula.

A sigmoido-vesical fistula should never be submitted to any plastic method of repair, unless a temporary colostomy has first been carried out. Lockhart-Mummery states that these fistula usually close after the performance of colostomy.

C. H. Mayo originated the important technical step of drawing the sutured portion of the sigmoid through an artificial opening in the omentum, so that it might be stitched to the peritoneal surface of the abdominal incision. A barrier of omentum is thus thrown between the defects of colon and bladder, and if leakage should occur, a safe exit is provided for the intestinal contents.

In cases in which peridiverticulitis has given rise to stenosis, tumour formation and the mimicry of carcinoma, resection is the ideal treatment, but it is a dangerous proceeding unless the area of involvement as shown by X rays is strictly localized and all signs of active inflammation have subsided.

Four different methods may be employed:

1. One-stage or primary resection, which is rarely possible and seldom advisable.
2. Two-stage resection, comprising a primary short-circuiting operation and secondary resection.
3. The three-stage or Mickulicz-Paul operation.
4. Devine's modification of the Mickulicz-Paul operation.

The Mickulicz-Paul resection or Devine's modification thereof is the only safe method when active inflammation is present, for there appears to be a special liability to post-operative peritonitis in all cases of diverticulitis.

When acute intestinal obstruction has supervened, temporary relief should be obtained by the performance of a caecostomy and radical removal left until a subsequent date.

In conclusion, diverticulitis is a complaint that can be arrested in all early and in most advanced cases and which can be kept indefinitely in check by suitable treatment; but, uncontrolled, it becomes a disabling and dangerous malady.

PSITTACOSIS IN AUSTRALIA.

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It has been the general opinion that psittacosis does not exist in Australia, and until about 1929, during the epidemics in other parts of the world, it was not a matter of importance. In 1929 the writer was asked to investigate a serious outbreak of fatal sickness in cage birds, especially the budgerigar or shell parrot (*Melopsittacus*), as grave fears were expressed that psittacosis had unfortunately been established in this country.

Budgerigars were at that time being imported in large numbers from Japan, and although it is

expected that such birds will show a heavy mortality, due to confinement in unhealthy cages, it was seen that local birds were also affected, and so badly that some bird-keepers lost practically the whole of their stock. It was also said that the disease developed after vessels had touched at some Australian port, and this was in a great measure supported by later inquiries. In any case, the mortality after the birds were landed was far too great to be attributed to the usual shipboard conditions.

The sick birds had the signs of an acute infection; the drooped attitude and ruffled feathers were particularly marked, diarrhoea was nearly constant, and many had a frothy nasal discharge which was often blood-stained.

Two types were recognized, ill defined, but roughly distinguishable by the degree of intensity of the outward signs.

Type I is the bacillary type. Although at first sight not so severe as Type II, this type was quickly fatal and few birds recovered. The *post mortem* findings were those of an acute enteritis. From the stools and blood, especially from the spleen, an organism of the salmonella type was isolated. Subcultures for several generations were highly infective, and the presumption that it was the causal organism was supported by agglutination in high dilution (2,000).

This bacillus, at first thought to be an atypical paratyphoid bacillus, which is a frequent cause of sickness in budgerigars, was later shown to be *Bacillus aertryke* B. It will be remembered that a similar organism had been blamed by Nocard as the cause of psittacosis, but it had by this time been definitely disproved, so that further investigation of this type of disease was abandoned.

Type II was apparently more severe than the other, but was not so rapidly fatal. If the bird did not die within a day or two, there was frequently seen a more or less acute form of remittent sickness with well defined periods of about a week. Many birds recovered and the progressive severity or otherwise of the relapses was an almost unfailing guide to prognosis. The signs were similar to the other type, but the *post mortem* examinations showed an involvement of the whole digestive tract, an almost invariable pneumonia; and enlargement of the liver and spleen.

This type could be distinguished with certainty by the more severe onset, a letting up about the fifth day so that the bird would even take food, a relapse in a day or two more, and a weekly intermission progressing steadily to death or recovery. Recovery was, however, very slow, and most birds succumbed to an attack of "paratyphoid" after many weeks' convalescence.

Although the blood and saliva were infective, no organism that could be blamed was isolated. A virus was suspected and later its filtrable nature was amply proved.

The position at this time was that a fatal sickness of parakeets was being caused by a filter-passer and

a provisional diagnosis of psittacosis was made. The symptoms could be those of any acute disease, but the *post mortem* findings closely agreed with those found in England in birds affected with psittacosis; no human cases, however, had been reported.

This last caused considerable doubt, which was strengthened by two important facts: the strain could not be kept alive in budgerigars for more than two or three generations and mice were more susceptible than the budgerigar.

In our opinion these things precluded a diagnosis of psittacosis, as it was then the general opinion that psittacosis was a disease of birds only, especially of parrots, except that it was highly infective for humans.

A theft of laboratory birds interrupted the work, and following the writer's own illness further work was abandoned with the firm conviction that there was no psittacosis in Australia. More recently that conviction has been shaken. It was formed at least on insufficient grounds and in ignorance of overseas investigations not then published.

It is now known that psittacosis may exist widespread in a more or less latent form and that the very objections raised by us five years ago are now generally held actually to support the possibility that there is psittacosis in this country. In other words, psittacosis does not persist from budgerigar to budgerigar, and mice are more readily infected and are in fact the laboratory animal of choice.

The absence of human infection is not a strong objection either. Owing to their rarity, human infections would probably not be suspected; but one suspicious case is available, and Dr. Love's notes on the writer's illness, published in this issue, are of interest.

These notes are remarkably like those of a mild case of psittacosis, and it should be noted here that there was every opportunity of infection, and no secondary cases were even suspected, a striking point of difference from influenza.

Summary.

1. A fatal disease was epidemic in budgerigars and other cage birds.
2. The disease was readily transmissible to mice.
3. The infective material was filtrable.
4. Local as well as imported birds were affected.
5. Acute, weekly intermittent and chronic cases occurred.
6. Lesions included greatly enlarged spleen and moderate liver enlargement.
7. This is compatible with a diagnosis of psittacosis and hardly of any other disease. Against this is the absence of human cases or at least the occurrence of but one suspected case, but Dr. Love's notes are strongly suggestive. It should be noted here that this enlargement of the spleen is found in many wild budgerigars and is said by Meyer and Eddie (California) to be an unfailing sign of mass infection with chronic psittacosis.
8. No definite conclusions can be drawn, but the way is open for further investigation.

Acknowledgements.

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Reports of Cases.

NOTES ON A SUSPECTED CASE OF PSITTACOSIS.

By J. LOVE, M.B., M.S. (Melbourne),
Melbourne.

THE following notes of a case suspected at the time to be psittacosis are instructive in the light of more recent knowledge of this disease, and especially so when doubt has been thrown on the absence of this disease from Australia.

C.R.M. had been in close contact with sick parakeets. He was first seen on July 22, 1930. He was in bed, feeling very ill, but with vague symptoms. Headache and photophobia were present. His temperature was 38.9° C. (102° F.) and rose to 40° C. (104° F.); it fell after a fortnight by lysis to normal in about four weeks. There was nothing characteristic except a regular rise from near normal in cycles for about eight days. Later, the temperature was subnormal for some days.

Slight epistaxis occurred on several occasions with nasal secretion. Headache was constant and intractable. The headache was most severe about the fifth day; it was chiefly frontal and was aggravated by a troublesome cough. Nocturnal delirium occurred.

The patient had a rigor and complained of general pains, "like influenza". He complained of abdominal discomfort and had anorexia. Constipation was present, with diarrhoea after aperients.

The sense of smell and flavours diminished. Taste proper, especially for salt and sugar, was greatly exaggerated, so that normally salted food, such as bread, was intolerable and only saltless bread, butter, meat *et cetera* were tolerated.

Herpes labialis was present. Sputum was scanty and blood-stained.

Physical signs: Crepitations were present at both bases, dull areas were present from day to day at the bases and at the angles of the scapulae. Breath sounds were variable. Respirations numbered 20 to 24 in the minute. The pulse rate was not much increased.

Rose spots, reminiscent of typhoid fever, were seen on the back and abdomen.

Dr. Henry Laurie and Dr. W. S. Newton saw the patient in consultation on several occasions. We regarded the condition as influenzal bronchopneumonia, but were not at all confident of our diagnosis and seriously considered typhoid fever and psittacosis.

Serological tests were carried out at the Baker Institute as follows: Tests to reveal the presence of *Bacillus typhosus*, *Bacillus paratyphoid A* and *B. Bacillus melitensis*, *Bacillus abortus*, *Bacillus proteus* X 19 were all without result.

Convalescence was uninterrupted, but slow, and was not completed for some months.

Reviews.

OCCUPATIONAL SKIN DISEASE.

THE death of R. Prosser White two days after he had corrected the final proofs of the fourth edition of "The Dermatogoses or Occupational Affections of the Skin"¹

¹ "The Dermatogoses or Occupational Affections of the Skin, giving Descriptions of the Trade Processes, the Responsible Agents and Their Actions," by R. Prosser White, M.D., M.B., C.M., M.R.C.S.; Fourth Edition; 1934. London: H. K. Lewis and Company, Limited. Demy 8vo., pp. 732, with illustrations. Price: 35s. net.

was a great loss to dermatology and to all those associated with the care of cases of occupational dermatitis.

Dermatargoses is defined as "skin disease due to work" and it is to be hoped that this new word will find favour in place of the more usual occupational dermatitis.

Prosser White spent the whole of his professional life in the town of Wigan, in the centre of the great industrial north of England. He gained a unique knowledge of trade processes and their associated dermatargoses. We must be grateful that this knowledge has been made available to us.

The wealth of references to other workers in this field is colossal. An excellent "Index to Authorities" is provided, which runs to no fewer than forty-two columns. In the text the source of each reference is given in the form of a footnote on the page where the reference occurs.

To a large extent this work is a compilation of opinions and findings of other workers in various parts of the world, and so reads unevenly and is at times contradictory.

The first two chapters are devoted to a general consideration of the pathological and aetiological factors at work in dermatargoses. In contrast to the opinion of a large number of dermatologists, Prosser White still professes a belief in the existence of endogenous eczema.

A table is given of distinguishing points between endogenous and exogenous dermatitis. It will be found useful to the medical man giving evidence in cases of reputed dermatitis. The changes occurring in the skin which has been exposed to excessive doses of X rays are said to be well described by the name *poikiloderma atrophicum vasculare*. This disease does give an appearance similar to X ray dermatitis, but is quite unconnected with it.

Alkali is described as being the most frequent producer of dermatargoses. Dry picric acid is extremely irritant, but when containing 50% moisture is not troublesome. A picric paint is much used by Prosser White in the treatment of dermatargoses and he has experienced no trouble with it. It is curious, however, to note the number of cases of dermatitis which follow the use of picric acid paints as skin preparations prior to operations.

Valuable detailed advice as to the treatment of dermatargoses is given. The formulæ for a complicated picric paint for use on uncovered areas and for a brilliant green paint for use on covered areas is given. These paints are specifically stated to be for use by the physician only and on no account to be prescribed for use by the patient. They are said to inhibit exudation and to relieve pruritus. The great benefit to be derived from small repeated doses of X rays is not mentioned. The pages devoted to treatment are sandwiched in between notes on fungus dusts and nasal ulcers and would easily be missed by the cursory reader. In future editions it is to be hoped that treatment will be given a chapter to itself.

Logan is quoted as considering "Barcoo ulcer" to be streptococcal in origin, but the undoubted rôle of vitamin deficiency is omitted.

Hair dye dermatitis is adequately discussed. It is of interest to note that the principal constituent of most modern hair dyes, namely, paraphenylene-diamine, must not be used as a hair dye in New York, France, Germany or Austria. Ingram is quoted as considering that: "Hair dye dermatitis should be regarded as medically and legally resulting from personal idiosyncrasy and not as a chemical irritant dermatitis due to negligence."

The general index runs to 270 pages and is amazingly complete. Any point of interest can be quickly found. A chance check of fifty entries was made and all were found to be correct. This book is essential to every dermatologist and to every medical man who is engaged in factory or industrial insurance practice. It is to be hoped that some other workers will be found to carry on the task in future years of keeping further editions up to date.

THE DEVELOPMENT OF RADIOLOGY.

In relation to the recent "Century of Progress" Exposition at Chicago, the four national radiological organizations of North America cooperated in holding what was the first American Congress of Radiology. In conformity with

the spirit of the occasion they appointed a Committee on History and Education, which resulted in the compilation and publication of an interesting and authoritative volume on the development of radiology since the discovery of X rays by Professor Röntgen in 1895.¹

Though the greater part deals, as one would expect, with the contributions made by American workers, there is due mention of the part played by their colleagues of other nations. In particular a valuable bibliography is appended to each section of the book.

It would be difficult to find elsewhere such concise and relatively simple statements of the present position of radium and X ray physics or of such other matters as the nature of cosmic rays or the application of X rays to industry.

Besides tracing the development of X ray apparatus, tubes, recording media and diagnosis, there are chapters dealing similarly with X ray and radium therapy, dosimetry, general biological effects, protection, the teaching of radiology and so on.

The volume is certainly worth reading by all radiologists, especially those who engage at any time in original work, or what they think to be such. It is extraordinary how much was done by the pioneers in the first few years of the radiological era, and how much of this was forgotten or overlooked, only to be rediscovered by others many years later. The persistent efforts to reintroduce paper to replace plates or films perhaps may be mentioned as a case in point.

A careful perusal of the appropriate chapters in this volume and of the corresponding bibliography will also save a lot of waste effort in carrying out investigations that have already been made by others. As suggested in the foreword to the book, it further should prevent the worker from being "deluded by ignorance or conceit into exaggerating the relative proportion or imagining the originality of a concept with which he presumes to augment the structure of radiology".

SPINAL CORD DISEASES.

NEUROLOGICAL literature has been enriched by the publication of a book entitled "Diseases of the Spinal Cord", by Williams B. Cadwalader, of the University of Pennsylvania Medical School.² This is a book which will be very helpful to graduates and students alike. The latter will find gathered into the first sixty-three pages a concise account of the anatomy and physiology of the spinal cord. The chapters on "Reflexes and Reflex Action", "Topographical Diagnosis" are well written and should serve to lighten some of the dark places in a subject too often thought by students to be wrapt in mystery.

All the local diseases of the spinal cord are adequately dealt with, but to those trained in English schools of neurological thought criticism of the author's method of dealing with progressive muscular atrophy is inevitable. Professor Cadwalader fails to stress the involvement of the pyramidal tracts in this disease and has retained the old artificial division of progressive muscular atrophy and amyotrophic lateral sclerosis into separate disease entities, whereas in reality the latter is merely a clinical variant of the former, in which the gravamen of the disease has fallen upon the anterior horn cells of the upper limb and the pyramidal tracts in the lower limbs.

This volume should find a place on the shelves of all interested in neurological medicine for the photographs and photomicrographs alone. These are well reproduced and, whilst being illustrative of the text, also constitute a splendid pictorial record of the results of disease processes of the spinal cord.

¹"The Science of Radiology", edited by O. Glasser; 1934. London: Baillière, Tindall and Cox. Royal 8vo., pp. 464, with illustrations. Price: 25s. net.

²"Diseases of the Spinal Cord", by W. B. Cadwalader, M.D., with introduction by W. G. Spiller, M.D.; 1932. London: Baillière, Tindall and Cox. Royal 8vo., pp. 222, with illustrations. Price: 29s. net.

The Medical Journal of Australia

SATURDAY, SEPTEMBER 8, 1934.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

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ACTIVE IMMUNIZATION AGAINST DIPHTHERIA.

IN 1923 S. F. Dudley published an important report in which he discussed *inter alia* the Schick test and immunity to diphtheria. This report was issued by the Medical Research Council of Great Britain as one of its special reports; an abstract of the report was published in this journal in August, 1923. Ever since that time Dudley has been working on the same subject, and from time to time the attention of readers of this journal has been drawn to his work. He has had a wealth of material at his disposal at the Greenwich Hospital School and has had the collaboration of P. M. May and J. A. O'Flynn. With these two collaborators he has produced another report, also presented by the Medical Research Council.¹ The Medical Research Council in its preface points out that this report, with the earlier one, forms a unique record of twelve years' continuous study of diphtheria, especially in its immunological aspect, in a semi-

isolated community where practically all factors have remained constant. Since it was not until 1928 that the school authorities allowed inoculation against diphtheria to be introduced, the authors of the report had ample opportunity of observing the occurrence of natural immunity; they made full use of this opportunity. Incidentally we may remark that it is the English habit to be thorough and not to turn back once the hand has been put to the plough. Only recently the scientific world had the privilege of seeing the completion by Mrs. Mellanby of a colossal piece of investigational work that had extended over many years.

The report contains a wealth of detail that will be sifted by all bacteriologists and hygienists; in the present instance we shall be content with discussion of one or two of the important aspects. Dudley and his co-workers found that three years' residence in a community where diphtheria was endemic could be accompanied by the development of as great a number of "Schick immunes" as three doses of toxoid could produce in three months in the same community. The process of natural immunization, however, was accompanied by a high morbidity; about one case of diphtheria occurred to every three or four latent immunizations. The rate of acquiring natural Schick immunity varied with the prevalence of diphtheria infection. When what is known as the *gravis* form of diphtheria bacillus made its appearance, an outbreak of modified diphtheria occurred; and it must be remembered that this happened in a community 90% of whose members had been shown by the Schick test to have been immune for the previous four years. Without going into further details regarding the observations of Dudley and his co-workers on the manifestations of the *gravis* and *mitis* forms of the diphtheria bacillus, it must be pointed out that all workers are not agreed as to the permanency of these types. One of the tentative conclusions of the report is that the Leeds *gravis* type of bacillus is a stable variation. In a post-script reference is made to the inability of Cooper, Duke and Fussell to classify diphtheria bacilli into three distinct types; their *gravis* type was unstable and showed a tendency to mutate to the *mitis* form.

¹ "Active Immunization against Diphtheria: Its Effect on the Distribution of Antitoxic Immunity and Case and Carrier Infection", by Sheldon F. Dudley, Percival M. May, and Joseph A. O'Flynn; Medical Research Council of the Privy Council, Special Report Series, Number 195; 1934. London: His Majesty's Stationery Office. Pp. 140, with illustrations. Price: 3s. net.

O'Flynn, one of the compilers of the report, had a similar experience before the typical *gravis* type invaded the school. Dudley, May and O'Flynn then state that work by Leete, McLeod and Morrisson does much to establish the stability of the *gravis* variants of the diphtheria bacillus. They conclude their postscript with the remark that time alone will show whether the Leeds *gravis* form is a stable mutation of greater pathogenic and epidemiological significance than other variations of the bacillus. Full knowledge of these types, of their distribution, of the reasons for their appearance and disappearance and so forth is important. Accurate knowledge of the types of bacillus peculiar to a community might make it possible to foretell epidemics with a greater degree of accuracy. Strangely enough, Dudley and his collaborators found no apparent difference in the efficiency of *gravis* and *mitis* types of bacillus as natural immunizing agents.

Dudley, May and O'Flynn's observations make it quite clear that active immunization in a community such as the Greenwich Hospital School is an almost certain protection against clinical manifestations of diphtheria. This, of course, is accepted and known among all practitioners of medicine. It must be emphasized, however, in view of another of their findings; and in regard to this matter we must point out that Dudley and his fellow workers repeatedly state that their observations were made on small numbers and must not be considered as having a general application. They found that active immunization was liable to increase the number of carriers of virulent bacilli and would be likely to increase diphtheria among the unprotected members of a community. They point out that this is another example of how an undesired effect often results when man tries to improve his biological environment by upsetting the ecological balance between two species. Lest this observation be used by propagandists against mass immunization, Dudley and his fellow workers accompany this statement by a reiteration of their belief in the effectiveness of an anti-diphtheria campaign, provided it is conducted in a proper way. The carrier question is of great interest. Latent immunization

is caused by carrier infection and the question might possibly be asked whether an attempt should be made on this account to cope with the carrier problem. The reply, of course, would be that the discovery of a carrier of virulent bacilli would result in instinctive action on the part of any hygienist. Further, it would be quite impossible to eliminate the carriers from any community, whatever efforts were made in that community, so that latent immunization would always proceed. In this connexion it is of importance to remember the tentative conclusion of Dudley and his co-workers that there was no difference in the efficiency of *gravis* and *mitis* forms of diphtheria bacillus as natural immunizing agents. This brings us back to the importance of knowing more about the variants of the diphtheria organism. These workers have shown that much can be done in the prevention of diphtheria; they make us ask whether all is being done that can be done; they also show us that much more investigation and observation are needed before the conquest of diphtheria is within sight.

TANNATT WILLIAM EDGEWORTH DAVID.

On August 28, 1934, Professor Sir Tannatt William Edgeworth David died after a life spent in a search for knowledge and crowded with achievement. His influence extended far beyond the confines of the University of Sydney, where for many years he adorned the chair of geology. During the Great War, at an age when many would have been content to stay at home, he went to the front with a mining unit. He was soon recognized as one who spoke with authority and became expert adviser in mining at General Headquarters. Perhaps more widely known is the story of his journey with Shackleton to Antarctica, his ascent of Mount Erebus, and his discovery with Mawson of the South Magnetic Pole. His observations in Antarctica rank among the most notable in science. But his war service and his Antarctic explorations were as brilliant beacons on an otherwise well lit path, a path that he trod with grace, humility and gentleness. The medical profession of the Commonwealth pays a warm tribute to his memory and glories in the lustre that he shed in the world of science.

Current Comment.

HEREDITY IN HYPERTENSION.

THIS critical age is not prepared to accept any teaching, however, traditional or however sponsored by famous authorities unless supported by adequate proof. Occasionally it is found that an opinion held widely for many generations is not in accordance with fact and, indeed, one famous English surgeon of somewhat revolutionary mind has stated that whenever an opinion is generally accepted as true it is probably false. However, it is with relief that we find that there is still a foundation beneath our feet some of which yet remains stable in spite of subversive modern medical thought, and when a simple statistical study confirms our faith in a long-held view we feel that perhaps our scientific forefathers really did know something after all. Such a study is given by David Ayman, who is known as an authority in hypertensive vascular disease.¹ He has set out to provide sure proof for the conviction of most physicians that this variety of arterial affection is a feature of certain families. As he points out, Dieulafoy, Broadbent, Allbutt, and many other eminent writers insisted upon the importance of inheritance of the tendency to arterial hypertension, and recent work has not only demonstrated the common occurrence of cardiovascular disease among the relatives of hypertensive patients, but has also shown that apparently healthy close relations of these patients also had blood pressures above the usually accepted normal. Instances of families in which there was an alarming incidence of vascular accidents have been published by many observers, and Ayman himself quotes a published observation of his own in which three generations were studied, there being 100% hypertensive in the first generation, 80% in the second, and 25% in the third. The method adopted in this research was very simple. The relatives of patients were examined when they came to visit the members of their families undergoing treatment in hospital. This method did not permit the study of all relatives, but it was simple and allowed a large number of families to be tested; moreover, when the object of the study was explained to the patient, an increased number of relatives visited the hospital to cooperate with the doctor thus interested in their welfare. The readings were taken as the subject sat at the bedside, an estimate of the pulse rate was made, a rough record was made of height and weight, the individual's knowledge of his own measurements being relied on, or an estimate was made by inspection and a second reading taken. When it was possible, the readings were repeated on another occasion. The usual mercury manometer was used and the auscultatory method was employed for the readings. This rough and ready method seems to have been quite satisfactory; and indeed it is perhaps as good a method as could be devised,

except by taking a great amount of time and trouble, for the emotional disturbances that are so likely to confuse blood pressure readings would be largely avoided by so apparently casual a technique. No less than 1,524 persons were examined in this way, representing 277 families. One of the most striking findings was that on comparing the children of persons who did not suffer from hypertension with those of persons who were so affected, the children of the former group showed a raising of the systolic and diastolic pressures in a much greater proportion. Thus only 3.1% of the offspring of parents whose blood pressures were regarded as normal were found to show any raising of the pressure, whereas in the case of the children of parents one of whom was known to have hypertension, no less than 28.3% had raised pressures. These younger people were studied between the ages of fourteen and thirty-nine, and a reading of 140 millimetres of mercury systolic and 80 diastolic was considered to be above the normal. In such an arbitrary matter as this it might be objected that such readings would not be regarded as very high, but it must be remembered that all the other apparently healthy persons examined showed pressures that were below these figures. What is still more interesting is that when both parents were known to be of the hypertensive type, no less than 45.5% were found to have unduly high blood pressures. It was found that on going over the results of examining the members of the second generation those individuals who were found to have elevated pressures, as judged by the accepted average for age, were also distinctly over-weight. The brothers and sisters of apparently normal parents were found to have raised blood pressures in 37.3% of the cases, but in the instance of the known hypertensive patients the brothers and sisters were also hypertensive in no less than 65.3% of the whole. During the course of this study opportunity was found to observe three generations, and the results were consistent with those previously referred to.

It seems impossible to escape the conclusion that the blood pressure is one of the physical characteristics that are individual and may be transmitted. Of course, nobody would say that all persons observed to have blood pressures above the recognized normal standard are of necessity doomed or even likely to suffer the more severe accidents associated with this physical state. It is rather that there is a group of people whose blood pressures tend to be high, just as there is that in which the pressures tend to be low. But the former are the more liable to suffer the baleful effects of arteriolar hypertension and are likely also to transmit such tendency to their children. The special knowledge of the general practitioner here should find an opportunity. Whether he safeguards such of his patients with sage advice about their lives, bears in mind the possibilities of arterial or cardiac strain, or is more than usually watchful for the onset of the toxæmia of pregnancy, he will be practising a true preventive medicine.

¹ *Archives of Internal Medicine*, May, 1934.

Abstracts from Current Medical Literature.

PHYSIOLOGY.

The Chemistry and Nature of Cerebro-Spinal Fluid.

LOUIS B. FLEXNER (*Physiological Reviews*, April, 1934) reviews the present knowledge of the chemistry of cerebro-spinal fluid with a view to determining the rôle played by the membranes separating blood and cerebro-spinal fluid in the formation of the latter, and in particular to determine whether the capillaries, tissue cells and epithelial cells of the choroid plexus perform work (in the thermodynamic sense) in this process or whether substances are distributed between fluid and blood, as would occur across an inert, lifeless membrane. He states that to treat the subject exactly it is not enough to know the concentrations of the solutes of plasma and cerebro-spinal fluid, since accurate analysis calls for the use of the activities or "effective concentrations" of all substances in the blood plasma, at the pressure which exists in the capillaries of the choroid plexus, and of substances in the fluid. As, however, there are not satisfactory data relating the activities of the substances in the plasma to those in protein-free fluids separated from the plasma, a discussion of this nature must at present introduce the inaccuracies and confusions which go with the use of concentrations. The distribution ratio of a solute's activities in blood plasma and a protein-free fluid separated from it is only approximately represented by its concentrations. Cerebro-spinal fluid contains practically no protein, so that if it were in equilibrium with plasma, the distribution of ions between the two solutions would be defined by the Gibbs-Donnan law. Deviation from this law for any substance involves a free energy change, and the sum of these free energy changes for all substances will equal the minimum amount of work necessary to account for the formation of the fluid. The author proceeds to review investigations on this subject, remarking that the literature is so large that he cannot attempt to include all the available reports of the last ten years. Of the non-electrolytes, amino-acids, creatinine, urea, uric acid and perhaps the sugar of spinal fluid, do not appear to be in equilibrium with the plasma. Recent data make the problem of sugar a difficult one; there is still divergence of opinion as to the nature of the principal reducing substances in cerebro-spinal fluid, and also as to whether the sugar of the blood is completely diffusible. Relatively high or low blood sugars within normal limits are not usually reflected accurately in the cerebro-spinal fluid, though hyperglycemia is accompanied by hyperglycorachia, and hypoglycemia by hypoglycorachia. With regard to electrolytes, the chloride findings are

compatible in a qualitative way with Donnan's law, since normal cerebro-spinal fluid contains a higher concentration of chloride than plasma, and this difference is reduced when the protein concentrations of the two fluids are made to approach one another and magnified when the protein concentrations are made more divergent than normal. On the assumption that the equilibrium distribution ratio from spinal fluid to plasma for univalent cations is 1.04, all of the ions excepting hydrogen and perhaps calcium and bicarbonate do not appear to be at equilibrium. This is true, too, for bromide, which fails to approach equilibrium after its blood concentration has been maintained at a high level for several days. The data, though not conclusive, favour the same for iodide. The foregoing statements are little altered by assuming the distribution ratio for univalent cations to be 1.13, as is found for chloride, instead of 1.04, for then the only ion which might be in equilibrium beside chloride is bicarbonate. The formation of the water of the cerebro-spinal fluid is accompanied by such complex changes in brain volume and blood volume that it cannot be regarded as a simple process of filtration. Because of the lack of membranes impermeable to the electrolytes of the cerebro-spinal fluid and blood plasma and capable of withstanding the great pressure involved (5,000 to 6,000 millimetres of mercury), it is, of course, impossible to measure directly the osmotic pressure of the fluid. Indirect methods are suggestive of osmotic equilibrium. The author concludes that the cerebro-spinal fluid is not a dialysate in equilibrium with the blood plasma. Nor is it to be regarded as an ultrafiltrate, for the pressure in the capillaries of the choroid plexus is too small to account for the free energy change which takes place in the formation of the fluid. These conclusions, however, are based on evidence which is far from ideal. More exact treatment of the nature of the cerebro-spinal fluid would probably be made possible if it were analysed at its chief site of formation, within the ventricles, rather than in the lumbar subarachnoid space. The present viewpoint with respect to some of the constituents may also be altered by more certain evidence of the state of the substances in the blood plasma and of diurnal variations, under basal conditions, of their concentrations. More important for an unequivocal analysis of the problem, however, is a knowledge of the activities of substances in the plasma and in the protein-free spinal fluid. This involves a difficult task, but perhaps one not beyond accomplishment.

The Influence of Environmental Temperature on the Utilization of Food Energy.

M. KLEIBER AND J. G. DOUGHERTY (*Journal of General Physiology*, May 20, 1934) have investigated the effect of the environmental temperature on growth rate, food consumption and

the conversion of food to body substance in warm-blooded animals. From general considerations they anticipated that an optimal environmental temperature for the conversion of food energy to the energy of body substance should exist, not only for cold-blooded, but also for warm-blooded animals. The lower the environmental temperature, the higher is the heat requirement for temperature regulation. As the energy intake of animals is limited by their capacity for eating, digesting and absorbing food, there is a minimum temperature under which the animal cannot maintain life indefinitely. The production of body substance will also be zero at extremely high environmental temperatures, when the appetite is decreased to such an extent that the energy intake covers only the minimal heat production for maintenance. It is to be expected that there is an optimum temperature between these two extremes. In order to investigate the truth of these predictions, baby chicks were kept in groups in a climatic cabinet at environmental temperature of 21°, 27°, 28°, 38° and 40° C. during the period of six to fifteen days of age. The intake of qualitatively complete food was determined by their appetite. Food intake, excretion and respiratory exchange were measured. Suitable control chicks were provided. The basal metabolism of each group was determined at the age of sixteen days. The daily rate of growth increased with decreasing environmental temperature from 2.74 grammes at 40° C. to 4.88 grammes at 21° C. The amount of food consumed increased in proportion to the decrease in temperature. At high temperatures the appetite was decreased. The composition of the gained body substance changed according to the environmental temperature. Protein stored seemed unrelated to body temperature, but fat stored dropped from a maximum at 32° C. to a minimum at 21° C. At this latter temperature the storage of water was at its maximum. The basal metabolism increased from an average of 60 calories per kilogram^{1/4} at 40° C. to 128 calories per kilogram^{1/4} at 21° C. The increase in net energy per unit of the corresponding increase in food energy seemed dependent on the environmental temperature, reaching a maximum at 38° C. and a minimum at 21° C. The prediction of an optimal environmental temperature for the efficiency of energy utilization is thus supported by the results of these experiments.

Changes in Cell Volume Produced by Varying Concentrations of Different Anticoagulants.

V. G. HELLER AND HENRY PAUL (*Journal of Laboratory and Clinical Medicine*, April, 1934), in a study of the distribution of certain inorganic elements in cells and plasma, found that the cell-plasma ratio varied not only with the nature of the anticoagulant but also with its concen-

tration. As the accuracy of their work depended on a definite cell volume, the literature was investigated to ascertain the preferable method of procedure. It appeared that the kind, concentration and manner of use of anticoagulants were almost as variable as the number of investigators. It seemed advisable therefore to investigate the effects of the commonly recommended anticoagulants. They employed sodium, potassium and ammonium oxalates of concentrations 0.1% to 0.4% by weight, the corresponding citrate salts of concentrations 0.2% to 0.8% by weight, and "Heparin" by concentrations 0.1 to 1.0 milligramme per cubic centimetre of blood. Cell volumes were determined, 4.0 millimetre bore hæmatocrit tubes, 15.0 centimetres in length, being used. The cell and serum heights were measured with vernier calipers. The tubes were filled by means of capillary tubing, after which they were sealed and suspended on a rubber cushion in a position which would bring their axes perpendicular to the axis of rotation while centrifuging. The authors concluded that increasing concentrations of sodium, potassium or lithium salts caused a decrease in cell volume, and that ammonium salts caused an increase in cell volume with increased concentration. About 0.2% of the oxalates and 0.4% of the citrates produced the most favourable results from the standpoints of anticoagulation and hæmolysis. Within normal limits a 0.2% concentration of a mixture of 40% potassium oxalate and 60% ammonium oxalate gave a minimum cell volume variation. A speed of 2,200 revolutions per minute was found most satisfactory. The use of "Heparin" is more difficult, as it does not dissolve as readily and there is consequently a tendency to form small clots about the particles of "Heparin". It cannot be dissolved and evaporated over the surface of the container, as it is an organic compound which might decompose on heating. The most satisfactory procedure is to make a water suspension. It is impossible to secure results that check as favourably as those for the inorganic compounds.

BIOLOGICAL CHEMISTRY.

The Action of Gastric Juice on the Globulin of Beef Muscle.

WILLIAM JAMES GRIFFITHS (*The Biochemical Journal*, Volume XXVIII, Number 2, 1934) has studied the interaction of gastric juice and muscle protein with the object of obtaining chemical evidence of the production of the active principle. Gastric juice was incubated with muscle protein in a buffered medium of approximately pH 6. The unchanged protein was removed by means of trichloroacetic acid and the nitrogen in the filtrate was determined. It was found that small amounts of soluble nitrogen were produced when normal gastric juice was incubated with beef muscle protein at pH 6. The amounts of this

nitrogen produced by the gastric secretion from patients with pernicious anemia were found to be diminished. In the few cases of achlorhydric anemia studied the results were found to be variable. The amounts of nitrogen produced at this pH were found to bear no relation to the magnitude of either tryptic or peptic digestion. The author considers that it is possible that the intrinsic factor of the gastric juice is concerned in the production of the nitrogenous substance. Bacteria were shown not to have any influence on the results obtained.

The Chlorides and Inorganic Constituents of the Serum and Cerebro-Spinal Fluid in Nephritis.

GEOFFREY CHALLEN LINDER (*The Biochemical Journal*, Volume XXVIII, Number 2, 1934) has obtained additional results which support the hypothesis that the very high chloride in the cerebro-spinal fluid in uræmia is concerned with a departure from the normal relationship to the chloride of the serum. A second important factor is the level of the serum-water chloride. When this was high it was found that the cerebro-spinal fluid chlorides reached a higher level, although the disturbance of chloride equilibrium was not so great. A third factor is believed to be the retention by the meningeal barrier of the power to resist the invasion of the cerebro-spinal fluid by sulphates, phosphates and other anions from the serum, thus preserving base to carry chloride and bicarbonate. Previous workers have found that a decrease in serum chlorides was the rule in uræmia, but others point out that in uræmia with high serum chlorides the bicarbonate may be extremely low, as was the case in an example quoted by the author. The author considers that these facts explain the rarity of a very high cerebro-spinal fluid chloride content in uræmia and their evil significance. He concludes that a very high cerebro-spinal fluid chloride content indicates the presence of: (i) disturbance of the normal relationship between serum and cerebro-spinal fluid, and (ii) a high serum chloride with a very severe acidosis.

Vitamin E.

H. S. OLCOTT AND H. A. MATTILL (*Journal of Biological Chemistry*, February, 1934) have examined various aspects of the chemical and physiological problems concerned with vitamin E. A curative method of assay was used. A single large dose of vitamin E was found to be sufficient for fertility for two gestations but not for three in female rats. The mothers on a diet deficient in vitamin E required more than 8% of yeast in the diet for normal lactation; and paralysis in the young could not be cured by the administration of vitamin E once the symptoms had appeared, although spontaneous recoveries had been observed. An active concentrate was prepared from lettuce by methods of fractional crystallization and distillation, and the authors describe a shortened

method for preparing concentrates from wheat germ oil by similar procedures. Some of the properties of these concentrates are tabulated. Vitamin E was found to be destroyed by bromination, but not by acetylation, benzylation, mild oxidation with silver nitrate or hydrogenation, and strongly to resist saturation with hydrogen. Potassium permanganate was found to destroy the vitamin. Vitamin E, when injected subcutaneously, was found to have no effect on the ovaries, uterus, opening of the vagina, or cornification in the immature rat. The alleged relationship between xanthophyll and vitamin E was investigated, but the results gave no indication of an immediate relationship between the two substances.

Protein Consumption and Requirement in Man.

WILHELM HEUPKE (*Münchener Medizinische Wochenschrift*, March 9, 1934) discusses protein consumption and requirement in man. He quotes instances of extremely high and extremely low protein intake without apparent detriment to health or to activity. Among the high extremes are the Eskimos, who take as much as 280 grammes of protein daily, getting 44% of their calories in this way and most of their other calories in fat. Certainly they die comparatively early, but their deaths are due to other than dietary causes, and they show no marked tendency to disease of kidneys or of blood vessels. On the other hand, no disease is known which can be attributed to protein deficiency in the diet. During the war many sufferers from "hunger oedema" were getting only 40 grammes of protein per day, but their illness was attributed to malnutrition in general, not to lack of protein. It is now known that much of the ill-health formerly ascribed to protein deficiency was due to lack of vitamins or of other dietary constituents, or to insufficiency of calories. Chittenden, Neumann, Ragnar Berg and others have demonstrated that health and vigour can be maintained and improved on a diet containing only 30 to 50 grammes of protein daily. This is further illustrated by the races who habitually take a diet of low protein value. In southern Italy, in Egypt, in the East generally, the protein intake *per diem* ranges from 50 to 60 grammes, with urinary nitrogen excretion in some cases (for example, the strictly vegetarian Brahmins) as low as 5.1 grammes. That such diets are not inconsistent with bodily vigour is demonstrated by the energy and strength of the rickshaw coolies and other labourers. The author concludes that for most forms of food the protein minimum requirement *per diem* lies between 30 and 40 grammes and that 80 is fully sufficient. An optimum amount cannot at present be laid down. On the whole, a very high protein diet is not advisable, and particularly a diet rich in meat. Gout and hypertension are known to be less frequent in vegetarians than in those who take a mixed diet.

Special Articles on Treatment.

(Contributed by request.)

XXXIX.

TREATMENT OF CONDITIONS OF THE EXTERNAL AUDITORY MEATUS.

BEFORE considering the detailed treatment of various conditions of the external auditory meatus the general guide for such treatment must be recognized, which is embodied in the following "golden rule", namely, "keep the canal clean and dry". Avoid the use, or rather the abuse, of: (i) peroxide of hydrogen, which is seldom necessary and often harmful; and (ii) wool plugs, which prevent drainage and which, by keeping the canal moist and warm, form an almost ideal culture bed for organisms.

Mild infective or irritant conditions of many weeks' or even months' duration under peroxide drops and wool have been repeatedly cleared up rapidly when the peroxide and wool have been abandoned and replaced by rectified spirit and gauze.

It must also be recognized that the area under consideration is a small portion of skin, affections of which are modified by anatomical peculiarities.

Requisites for proper treatment of external auditory meatus conditions include a good light, one which will give a view of the meatus right to the tympanic membrane. There are several styles of lighting available, perhaps the most popular being the convenient Winchester head-light—a bulb and reflector worn on the forehead and supported by an elastic band, the current being supplied by a torch battery. For myself, for treatment purposes I still prefer the forehead concave mirror with a focal distance of eight inches and a central aperture of half an inch diameter, the source of light being a good electric light bulb, preferably of the frosted type, but even a candle will suffice, provided the natural light of day or other extraneous light be excluded. This method of illumination directs the rays of light in the same path as the vision, which is so necessary when working at the other end of a long, narrow canal and, unlike the electric otoscope, it leaves both hands free for treatment. For examination and diagnostic purposes I often find the electric magnifying otoscope to be invaluable; but I find it unsatisfactory for dressing the meatus, although useful for a simple paracentesis of the drum membrane. We are now, however, dealing with conditions of the external auditory meatus.

In addition to the illumination, we require for dressings fine angular aural forceps and fine wool carriers, assorted sizes of aural specula with oval tips, a good aural syringe, small hooks for foreign bodies.

As manipulations of this area are to be done gently, but thoroughly, instruments must be light. I do not know why aural specula with round tips are on the market; the cross-section of the canal is oval, and an oval-shaped speculum will penetrate deeper with less discomfort than a round-tipped one, and will give better access and illumination and more room for working.

To treat conditions of the external auditory meatus satisfactorily the above is the minimum equipment, *plus* certain drugs and dressings.

Before leaving the subject of instruments let me condemn the commonly used wooden wool carrier. This is too large and clumsy and rigid for a proper cleansing of the meatus, which is not a straight canal, but curved, and which, with the tympanic membrane, forms a pocket at the inner end, which pocket cannot be reached by the usual wooden wool-wound carrier.

Now to consider the various affections in detail.

Foreign Bodies.

Of foreign bodies the most common is impacted cerumen, the removal of which, of course, is by syringing. The two points to be observed are: (i) Pull the ear upwards and backwards and thus straighten the canal, and also enlarge

its lumen. (ii) Direct the stream of fluid obliquely to one or other in turn of the walls of the meatus. The fluid (sterile water) should be of body temperature; too hot or too cold a liquid will cause considerable discomfort or irritation of the inner ear.

In the case of hard impacted wax I have given up the use of hydrogen peroxide or a 2.5% solution of bicarbonate of soda in favour of the old-fashioned olive oil, which is most efficient in softening the wax and which can be instilled by the patient for two or three days. The removal by an aural syringe is then easy.

Solid foreign bodies, which most commonly are found in children, if not removable by syringing, can be removed by means of a small right-angled hook gently insinuated along the most convenient wall of the meatus. A general anæsthetic is in most cases necessary, and quite useful assistance is obtained from the force of gravity.

After removal of the foreign body insert a gauze wick saturated with alcohol. If there be injury to the *membrana tympani* involving the tympanic cavity, treatment should continue until this is healed, the basis of such treatment being to keep the meatus clean and dry with alcohol.

Acute *otitis media* and mastoiditis are unfortunate complications which sometimes follow injury by a foreign body or injudicious attempts at removal. A post-aural incision, turning the pinna forwards and opening the meatus, is rarely necessary to remove a foreign body.

Insects *et cetera* are, as a rule, readily removed by syringing. A useful emergency treatment for live insects is again alcohol, which kills the insects and is an antiseptic. In one case, in which my advice was sought by telephone, I advised this treatment. The meatus was filled with whisky; the insect, a small beetle, immediately vacated the premises and dropped dead on the table.

There is a condition called *keratosis obturans*, but this is really impacted cerumen with masses of exfoliated epithelium. It is treated by softening the mass with olive oil, syringing, and sometimes mechanical removal, followed by cleansing with rectified spirit and the application on a carrier of a little 5% scarlet red ointment.

Inflammations of External Auditory Meatus.

Inflammations of the external auditory meatus may be localized or general, acute or chronic. The common acute localized inflammation, which frequently becomes general, that is, furunculosis, is really similar to furunculosis of the skin elsewhere, but owing to the skin being firmly bound down, it causes considerable tension and is very painful. Owing to the anatomy, it is not as simple to treat, but should be treated on the same lines as those adopted for a boil or boils elsewhere. In the early stages heat and antiseptics should be applied locally to prevent infection of fresh follicles. Useful "ear drops" are composed of carbolic acid, 1.0 gramme (15 grains) (anæsthetic and antiseptic), glycerine, 16 cubic centimetres (four fluid drachms), and rectified spirit to 30 cubic centimetres (one ounce); these should be used together with heat, preferably dry. If a definite boil or furuncle can be localized, it should be incised under ethyl chloride anæsthesia and then the above treatment carried out. Frequently the patient is not seen until the meatus is almost closed. It should then be cleansed with a finely-wound thin wool carrier and alcohol and, if possible, a gauze wick should be inserted well into the canal and kept saturated with the above drops. Four grammes (one drachm) of ichthyol may with advantage be added to 30 cubic centimetres (one ounce) of the above drops, but ultimately forms a deposit deep in the meatus which requires removal.

After the condition has subsided it is advisable to continue the application of an alcoholic antiseptic twice daily for two or three weeks to prevent reinfection of the follicles. Furunculosis of the external auditory meatus may persistently recur, but when careful local after-treatment as recommended fails, the condition will probably not be restricted to the external auditory meatus, but the patient will be found to be subject to boils elsewhere or to *acne vulgaris*. In these circumstances vaccine treatment (staphylococcal), preferably autogenous, is the rational treatment. Stannoxyl tablets taken by mouth (three tablets twice a day) are sometimes useful.

A method of abortive treatment in the early stages which is strongly recommended by some is ionization of the external auditory meatus with a 3% solution of salicylate of soda, using a current of up to six milliampères for up to twenty minutes. One treatment, or possibly two, will suffice.

It is important to differentiate furunculosis which has become more than localized and which may be accompanied by marked swelling in any direction from *otitis media* and mastoiditis. In furunculosis there will be pain on moving the auricle or applying pressure that distorts the meatus; there may be marked post-auricular swelling and tenderness over the mastoid closely resembling that in mastoiditis, but the tenderness over the mastoid in furunculosis will be superficial and will not be increased by deep pressure unless the meatus be disturbed.

These extensions are to be treated on general surgical principles, but the relationship of the parotid gland in front of and possibly below the meatus must be remembered.

Acute Localized Ulcers.

Acute localized ulcers may be found in the meatus. They are usually of traumatic origin and are treated simply by cleansing with alcohol and applying a little simple ointment. If the ulcers do not heal, malignant disease must be suspected—squamous epithelioma. This should be diagnosed by use of the microscope, and is amenable to radium therapy.

Diffuse Inflammation.

A diffuse inflammation of the meatus may occur, usually secondary to *otitis media* or to some condition which keeps the meatus moist. Syphilis, tuberculosis, diphtheria, Vincent's organism must be considered and if found to be present must be treated accordingly. Most of these cases, however, respond readily to cleansing the canal as often as is necessary, maybe once a day or every two days, according to the discharge, and to keeping it dry.

When first seen the canal should be thoroughly cleansed with a finely wound carrier moistened with alcohol; then it should be carefully dried and a little 5% scarlet red ointment should be applied to the whole area on a wool carrier. A gauze wick (not a plug) is then inserted. Inspection in twenty-four hours' time will reveal a definite improvement unless the causative *otitis media* is of a nature to require more direct treatment; but that, however, does not come within the scope of this article.

Eczema of the Meatus.

Another diffuse chronic condition is a form of dermatitis, commonly called eczema of the meatus. This is frequently due to moisture, maybe secondary to *otitis media*, which then must be efficiently treated. It is frequently caused by energetic attempts on the part of the patient to "clean his ears" and dry them out with a towel; such attempts invariably leave the skin of the meatus moist. The human skin will not stand continued moisture without injury.

This eczema is commonly associated with seborrhœa, which then requires treatment. The treatment of the local condition is really very simple. I have not seen this treatment described in text books, but experience has proved its value. Do not syringe the ear unless masses of debris require it; cleanse the canal thoroughly, but gently, with a finely wool-wound carrier moistened with alcohol. Very occasionally one or two moppings with the least possible amounts of peroxide of hydrogen will help, followed by the alcohol and drying; then apply a little 5% scarlet red ointment on a carrier to the surface of the canal and to any excoriations surrounding the meatus. Relief of the irritation is immediate, and in twenty-four hours the condition will be definitely improved and the patient delighted. Another treatment may be required. The patient should then be instructed how occasionally to cleanse the meatus with an alcohol-moistened mop, dry, and apply a very little of an ointment composed of the following: *unguentum hydrargyri nitratis dilutum*, 4.0 grammes (one drachm); *unguentum zinci oxidi*, 8.0 grammes (two drachms); *lanolini ad* 16.0 grammes (four drachms).

Otomycosis.

Otomycosis, a condition of the external auditory meatus caused by a fungus which is fairly common and is again encouraged by moisture, causes a mild irritating ache and deafness. It produces a greenish-black, blotting-paper-like mass definitely diagnosable by the microscope, and is treated by first removing the mass by syringing, then drying, and using a solution of biniodide of mercury, one in one thousand of alcohol. These drops should be continued for two or three weeks to prevent recurrence by germination of spores. This condition sometimes results in superficial damage to the *membrana tympani*, and unless properly treated may even result in perforation.

Finally, let me once more emphasize the necessity for keeping the skin of the external auditory meatus clean and dry by thorough and careful mechanical cleansing and the use of alcohol. "Wet" treatments frequently lead eventually to ulcerations of the skin, possibly to perlostitis and molecular necrosis of the underlying bone.

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British Medical Association News.

SCIENTIFIC.

A MEETING OF THE NEW SOUTH WALES BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the Royal North Shore Hospital of Sydney on June 21, 1934. The meeting took the form of a series of clinical demonstrations by members of the honorary staff.

Jacksonian Epilepsy.

DR. F. GUY GRIFFITHS showed a male patient, aged forty-nine years. This patient had been shown two years previously at a clinical meeting at the Royal North Shore Hospital and at that time it was thought that he was suffering either from Jacksonian epilepsy or from a psychoneurosis. Dr. Griffiths pointed out that his condition was described in THE MEDICAL JOURNAL OF AUSTRALIA, September 10, 1927, at page 370. The patient suffered from: (i) coarse tremor and weakness of the left arm and leg; (ii) convulsions with loss of consciousness, aphasia and amnesia; (iii) what was thought to be possibly a fracture of the left parietal bone.

The patient now reported that at Broughton Hall in 1927 he was certified as totally and permanently unfit, but that he was refused a pension. He also stated that in 1929 his head was laid open on the left side, near the top, by a motor car, that seven or nine stitches were put in, that he recovered completely and had had no fits since that date.

Myotonia Atrophica.

DR. W. W. INGRAM showed a female patient, aged thirty-eight years, who had lived all her life in a country district in New South Wales. She had suffered from rheumatic fever at ten years of age, from pneumonia at seventeen years of age, had been operated on for hernia at twenty years, had had her uterus curetted at thirty-three and again at thirty-four years of age. Both her tubes and her appendix had been removed when she was thirty-four years of age. Seven years ago the right thumb and index finger were injured in an electric wringer, but had completely recovered, she said, before the present illness commenced.

Three years ago she found that the thumb and index finger of the right hand were getting weak. She had difficulty in picking things up and was becoming clumsy and awkward in her movements. She also had pain in the right arm, brought on by work and eased by rest. Weakness and tingling also appeared in the fourth and fifth fingers of the left hand. She then noticed that she had difficulty in going up stairs and also in lifting her

head off the pillow when getting out of bed in the morning. No other members of her family had been affected by weakness or paralysis.

On examination it was found that there was wasting of all the muscles of both forearms, especially of the right. The intrinsic muscles of both hands were also wasted. The sterno-mastoid muscles had practically disappeared and the muscles of both legs below the knees were much wasted. She was unable to lift her head off the pillow and had to roll over on one side to get up. She had double wrist-drop, and on gripping with the right hand she had great difficulty in letting go, so that the right hand clung to the person with whom she shook hands. She was unsteady in her gait and her hair was falling out. There were no sensory changes. The disks and fundi were normal. Tendon reflexes were present throughout, except in the ankles and wrists, and the toes gave a flexor response. No muscular fibrillation was observed.

The electrical reaction of the affected muscles showed weakness with slow relaxation in both sterno-mastoids and in the long flexors of both hands. X ray examination of the cervical spine revealed some spondylitis and slight osteoarthritis. Both the Wassermann and Kahn tests gave no reactions. Her creatinine excretion averaged between 70 and 73 grammes per day. On May 21 she was given "Glycine", 15 grammes twice daily, along with 0.015 gramme (one-quarter of a grain) of ephedrine. The creatinine excretion is set out in the accompanying table, showing that the amount excreted rose and fell again for no accountable reason. On June 15, 1934, the ephedrine was omitted. The "Glycine" did not appear to have improved the condition very much. The patient said that her hands and legs felt stronger and she could now dorsiflex the right hand.

Table showing Creatinine Excretion before and after Glycine and Ephedrine Administration.

Date.	Days from First Estimation.	Creatinine Excretion per 24 Hours (in Grammes).	Dose of "Glycine" per Day (in Grammes). Parentheses indicate for One Day Only.
May 15, 1934 ..	1	0.73	—
May 16, 1934 ..	2	0.70	—
May 21, 1934 ..	7	—	15
May 25, 1934 ..	11	—	30
May 27, 1934 ..	13	0.78	(15)
May 30, 1934 ..	16	0.95	30
May 31, 1934 ..	17	0.75	30
June 4, 1934 ...	21	0.81	30
June 6, 1934 ...	23	—	(15)
June 7, 1934 ...	24	0.80	(15)
June 14, 1934 ..	31	0.90	30
June 18, 1934 ..	35	0.76	30

Cerebral Tumour.

Dr. Ingram also showed a female patient, aged forty-nine years, who had lived an active life as a nurse. She had had no illnesses until seven weeks before admission to hospital, when she began to suffer from severe headaches in the temporal regions, which were relieved by hot packs over the temples. The headaches became more severe and were accompanied by vomiting. She noticed that her eyesight was failing. Her friends and relatives also noticed that her temperament had quite changed and that from being pleasant and easy to get on with, she became irritable and was constantly finding fault with her relatives.

Three weeks before the meeting all her symptoms improved very much; her headaches disappeared and she had not vomited since. She answered questions quite intelligently and readily. All her cranial nerves appeared to be intact and there was no weakness of the arms or legs. Her reflexes gave a normal response. Examination of the fundi disclosed double papilloedema with a choked disk on the left side. Examination of the fields of vision disclosed that she had a right complete homonymous hemianopia.

X ray examination of the pituitary fossa disclosed that there was some absorption of the posterior clinoid process of the *sella turcica*. A Wassermann test gave a negative response, but the Kahn flocculation test gave a weak positive reaction. The cerebro-spinal fluid was under normal pressure, was quite clear and contained: protein, 0.12%; chlorides, 740 milligrammes *per centum*; sugar, 0.10 milligramme *per centum*. There was no hypertension or albuminuria.

The tumour was situated in the region of the *sella turcica* and was pressing on the left trunk of the optic chiasma.

Pulmonary Osteoarthropathy.

Dr. Ingram's third patient was a labourer, aged forty-six years. He had lived in New South Wales all his life. He had always been very strong and healthy and suffered no illness till two and a half years ago, when, as the result of working in a storm-water channel, he got a chill and was admitted to a public hospital with a diagnosis of rheumatic fever. He was detained in hospital for seven weeks and all his teeth were removed. About eighteen months ago, on being questioned, he said that he noticed that his hands and feet were getting bigger.

He had had during the eighteen months several recurrences of joint pain, especially in the ankles, knees and wrists; these were not severe enough to interfere with his work. At the beginning of May, 1934, he had a severe attack of articular rheumatism affecting the hands, wrists, knees and feet. The pain was very severe, accompanied by much swelling.

He was admitted to the Royal North Shore Hospital on May 23, 1934. His temperature was 37.6° C. (99.8° F.) and his pulse rate 112. Throughout his stay in hospital he had had intermittent fever. His knees, ankle joints and wrists were very swollen and tender and caused him great pain. His hands and feet were found to be enlarged and deformed. The fingers and toes were unusually long. The ends of the fingers and toes were greatly swollen, with deformities of the nails. The swelling was symmetrical in all the fingers and toes. There was also thickening of the lower ends of the radius and ulna and of the metacarpal bones. The lower ends of the tibia and fibula and of the femur were also thickened.

He had had for some years a slight cough, which he attributed to cigarettes, but which was not always present, and apart from the cough he had no chest symptoms.

Dr. Sear examined the patient with X rays and had reported that there were changes in the long bones typical of pulmonary osteoarthropathy. There was nothing in the films to suggest an underlying secondary malignant condition (such as bronchogenic carcinoma). Dr. Sear said that he would like to examine the patient's chest. Slight osteoarthritic changes were present. There was no evidence of changes typical of acromegaly.

An examination of the patient's chest revealed signs of consolidation at the left base posteriorly with an inconstant pleural friction rub. X ray examination of the chest revealed a rounded mass at the left base towards the cardio-phrenic angle. The diagnosis lay between neoplasm and hydatid cyst.

A Casoni test for hydatid disease gave no reaction. The Wassermann and Kahn tests gave no reaction. Cultures from the patient's tonsils gave a pure growth of *Streptococcus viridans*.

X ray examination of the nasal sinuses revealed that there was considerable thickening of the mucosa of both antra. The pituitary fossa was not enlarged.

With salicylates and colchicum the pain and swelling of the joints had greatly subsided, although the appearance of the hands and feet had not altered.

Phrenic Avulsion in Apical Cavitation.

DR. COTTER HARVEY and DR. V. M. COPPLESON demonstrated six cases illustrating the value of phrenic avulsion in apical cavitation. It is hoped that these cases will be reported in full in a subsequent issue.

Pneumothorax as a Sequela of Lung Abscess.

Dr. F. J. BRIDGES showed a male patient, aged seven years, who first came to hospital in September last, suffering from laryngeal diphtheria. During a long and dangerous illness he developed lobar pneumonia and a lung abscess, with characteristic signs and symptoms. X ray films taken at that time showed that in addition to the lung abscess the patient also had a small pneumothorax in the region of the upper part of the affected lung, the right.

He returned home comparatively well, though manifesting signs of cavitation in the lung, associated with much offensive sputum. On June 6 the child, while at play, suddenly became breathless and cyanosed. Examination then revealed the signs of a complete pneumothorax of the right side, the mediastinal contents being pushed bodily over to the left. These signs still persisted, but were not now so pronounced. An X ray film showed the existing state of affairs, an unusual feature being the loculation of the pneumothorax, well seen in the films, by pleural adhesions. The sputum had completely disappeared.

Progressive Muscular Atrophy.

Dr. Bridges also showed a woman, aged sixty-one years, who was suffering from progressive muscular atrophy of the glosso-labio-laryngeal type. She presented the following clinical picture. She spoke only with some difficulty and her articulation over a period of some months had become more and more blurred. She swallowed food only when it was "washed down" with fluid and was cut in small pieces. There was marked and increasing wasting of the thenar eminences and of the interossei muscles. The palate moved badly and the tongue showed fibrillary twitchings. The patient had some difficulty in walking, was "always tired" and suffered from "cramps". The reflexes of all skeletal and abdominal muscles appeared normal and there was no sensory loss. The Wassermann test gave no reaction and the cerebro-spinal fluid was normal.

Osteitis Deformans.

Dr. Bridges also showed two patients who were suffering from *osteitis deformans* or Paget's disease. He said that it was a malady of which the cause was unknown. Its main features were an enlargement of the skull, kyphosis and bowing of the bones of the extremities. The bones of the skull or the tibiae were usually first affected. In these the changes consisted in the formation of new subperiosteal bone, with deeper areas of rarefaction. Destruction and rebuilding of bone thus proceeded together. Cysts containing cloudy fluid were often encountered. These processes went on very irregularly in the bones involved. In the early stages of the disease the bone was soft and might be cut with a knife. Later the bones became outwardly white, nodular and heavy, their appearance suggesting that they were carved from stone. The deeper bony structure was porous and friable.

In a developed case the skull bones might be three-quarters of an inch thick. The cranial sutures were obliterated and the furrows traversed by the cerebral vessels changed into deep grooves. All patients were sufferers, almost invariably, from arteriosclerosis, associated not seldom with cardiac hypertrophy and valvular atheroma. Joint changes were uncommon.

Clinically, *osteitis deformans* was more common in males of from forty to sixty years of age, and it tended to show a familial incidence.

A typical case might commence with a slow enlargement of the head or a steady thickening and bending of the tibiae and bones of the forearm. The face became converted into a triangle with its base uppermost, the legs and arms were bowed forwards and outwards. Kyphosis was often exaggerated and mostly affected the upper dorsal region—the spine was rigid. The bones of the pelvis and shoulders might be involved, though to a less extent. Body height was often reduced by four or six inches. The hands and feet usually escaped damage.

The radiographic appearances were characteristic and would prevent a diagnosis of localized bony growth, of

syphilitic affection, or of rickets. The bodily enlargements of acromegaly involved soft parts as well as bone.

The course of the disease often extended over twenty to thirty years, with the gradually increasing deformity and crippling of the patient. Pathological fracture of long bones was not unknown. Treatment was varied. "Afenil" injections, calcium lactate, thyroid extract, parathyroid extract, solar therapy, cod liver oil, adrenaline, thymus, potassium iodide had been used in vain; no cure was known.

This was no new disease. It had left its marks on Egyptian mummies and, according to Butlin, the Neanderthal skull was that of a man with *osteitis deformans*.

Dr. Bridges's first patient with *osteitis deformans* was a woman, aged sixty-two years, who, in August, 1933, had fallen and fractured her right tibia, ten centimetres below the knee. Since that time she had fractured the left tibia. X ray examination showed that the condition was advanced in both bones, but that good bony union was present over the site of the old fracture.

The other patient with *osteitis deformans* was a man aged thirty-one years. He had no symptoms of the disease, but manifested extensive radiographic signs of it.

Dr. S. H. SCUGALL, Dr. A. R. HAMILTON and Dr. A. L. DUCKER showed a woman, aged forty-seven years, who reported three years ago that her right tibia was getting bigger and becoming bowed. For a week a dull aching pain was present in the leg.

Examination revealed anterior bowing of the right tibia. Full movements of the knee and ankle were present.

X ray examination of legs, spine and pelvis revealed early *osteitis deformans* of the right tibia with anterior bowing.

Treatment consisted in the application of general ultra-violet light, high vitamin dietary, and "Radiostol", 0.6 cubic centimetre (ten minims) three times a day.

The pain in the leg was relieved temporarily by diathermy, but had returned since, and at the time of the meeting there was pain in the lower part of the right leg, which was becoming more bowed and more swollen.

Dr. Scougall, Dr. Hamilton and Dr. Ducker also showed a man, aged forty-six years, who two and a half years ago complained of pain in both shoulder joints. Other joints were clear.

On examination marked grating of the acromio-clavicular joints was noted. Extensive pyorrhea was present and it was decided that teeth should be removed.

X ray examination of the shoulders showed osteoarthritis of both acromio-clavicular joints with early Paget's disease of the upper end of the right humerus.

Hot air, as a placebo for pain, produced much relief, and after three months the patient discontinued treatment.

At the time of demonstration there was no disability in the shoulder and the patient could carry bags of wheat on the affected part without discomfort.

Hypertensive Encephalopathy.

Dr. D. W. H. ARNOTT showed a man, aged twenty-four years, a labourer, who gave a history that two weeks previously he noticed difficulty in manipulating his fingers and could not roll a cigarette. For about one month he had noticed involuntary movements of the arms and legs with twitching of the mouth. For the past month also his speech had been slurred and he complained of intermittent headaches.

On examination right-sided facial paresis had been noticed. The speech was slurred. Slight weakness of the right arm was noted. The knee jerks were exaggerated. The plantar reflexes were flexor in type. No ankle clonus was present. The ocular fundi were normal. The systolic blood pressure was 206 millimetres and the diastolic pressure 156 millimetres of mercury. The specific gravity of the urine was 1016 and it contained a heavy cloud of albumin.

The Wassermann and Kahn tests gave no reactions and the cerebro-spinal fluid, which was under increased pressure, was normal except for an excess of protein. The blood urea was 57 and the blood creatinine 2.6 milli-

grammes per centum. The urea concentration test yielded the following result:

	Urea.	Volume.
Before draught ..	1.3% ..	600 c.cms. (20 ounces).
One hour after ..	1.0% ..	180 c.cms. (6 ounces).
Two hours after ..	1.1% ..	180 c.cms. (6 ounces).
Three hours after ..	0.9% ..	150 c.cms. (5 ounces).

Dr. Arnott said that the patient's neurological signs had all improved, but there still remained some slurring speech, right-sided facial paresis and slight weakness in the right arm. At the time of demonstration the systolic blood pressure was 195 and the diastolic pressure 155 millimetres of mercury.

Dr. Arnott explained that cerebral episodes of this type sometimes occurred during the course of acute, subacute and chronic glomerulo-nephritis. The latter was the condition from which the patient apparently suffered.

The result of the urea concentration test indicated that there was definite impairment of the renal function; the increased blood urea indicated renal decompensation.

There was still some doubt as to how these cerebral lesions occurred, but Volhard believed that they were caused by ischaemia from arteriolar spasm which secondarily caused oedema of the brain.

The treatment was as follows: (i) repeated lumbar puncture, (ii) venesection, (iii) repeated doses of sulphate of magnesia, (iv) intravenous injection of hypertonic saline solution or 50% glucose solution. The prognosis as regards the attack was good, if the patient was treated as had been outlined, but the ultimate outlook was very poor.

Thrombo-Angiitis Obliterans.

DR. S. H. SCOUGALL, DR. A. R. HAMILTON and DR. A. L. DUCKER showed a male patient, aged forty-one years, who was suffering from *thrombo-angiitis obliterans*. The patient was a motor mechanic. He had smoked a pipe exclusively until 1931, when he became a heavy cigarette smoker. He gave a moderate history of potus.

According to the patient's early history, his left foot first gave him trouble while he was on active service in 1915. The foot became sore, blistered easily and gave way while the patient was route marching. In 1917 he suffered from trench foot, the left foot only being involved. No symptoms were felt in the right foot until 1931, when the patient complained of pain in the toes accompanied by black discoloration. The patient had had a chronic cough since the war and denied venereal infection.

The patient was first admitted to hospital in March, 1930, suffering from what was regarded as cellulitis of the left great toe of twenty-five years' duration. The toe had been incised and the nail removed one month before his admission to hospital. On admission the toe was swollen, red and tender, and discharged pus. The knee jerks were then exaggerated and the pupils were equal and active. The patient was transferred to the outdoor department four days later.

In April, 1930, the second toe was swollen and painful and the patient stated that blisters frequently formed.

In May, 1930, the middle toe became inflamed. In October, 1930, the patient complained of pain in the left foot. Colour changes were present. The arteries were found to be normal; the systolic blood pressure was 158 and the diastolic pressure 100 millimetres of mercury.

On December 6, 1930, the patient was readmitted to hospital. He then stated that for the previous eleven months he had experienced pain in the left great toe, in the side of the foot and in the back of the ankle. This pain came on at any time, but chiefly while he was walking. At other times the foot felt numb or became swollen and turned white; on subsidence of the swelling the foot became blue and was most painful. White blisters formed on the dorsum of the toes and of the foot and exuded a clear fluid when ruptured. At that time no mention was made of the right foot.

On examination the colour of the left foot was normal; the anterior half felt cold and regained its colour more slowly after pressure. A provisional diagnosis of Raynaud's disease was made.

On December 8, 1930, lumbar ramisection was performed on the left side, the white rami being divided as well as the sympathetic trunk below the lowest ganglion.

On December 15, 1930, pain was present in the fifth toe. It was mottled blue and red, and tender to touch. The foot was warmer than it had been previously.

On December 22, 1930, the patient was transferred to the out-patient department. The fifth toe was not so painful and its colour had improved.

On January 2, 1931, the patient was readmitted to hospital because of pain in the fifth toe, which was swollen and congested. Whitish patches and a sero-purulent discharge were present. The foot was warm to the touch and the remainder of the foot was of a good colour.

On January 12, 1931, periarterial sympathectomy was performed, one inch of the perivascular coat being removed from the femoral artery in the middle third of the thigh. Three days later it was noted that no pain was present in the fifth toe.

On January 29, 1931, the patient was transferred to the outdoor department. Severe pain recurred in the fifth toe on March 11, 1931, and on July 17, 1931, it was noted that the fifth toe had healed.

On July 15, 1932, the colour of the toe was good, but the patient complained of pain in the left calf on walking.

In January, 1933, definite colour changes, white to purple, were noticed in the left foot and the symptoms were more pronounced in the right.

In April, 1933, the patient was found to have a duodenal ulcer.

On May 19, 1934, the patient was readmitted to hospital on account of severe gnawing pain in the right foot. Colour changes, white to blue, were present, as well as trophic changes, and the patient complained of cramps in the right leg on walking. These symptoms could be relieved only by the patient hanging his foot downwards in a basin of warm water. The left foot had now considerably improved, being quite warm and of a good colour.

On examination the *dorsalis pedis* artery was just palpable in the right foot. The foot felt cold and was hypersensitive. The second toe felt dead. The great toe was blue and sensitive, with several small areas of commencing ulceration. The fourth toe was cold and was the site of extensive superficial necrosis. The fifth toe was swollen and sensitive and the entire foot was oedematous. A provisional diagnosis of Buerger's disease or *thrombo-angiitis obliterans* was made.

On May 21, 1934, sympathetic ganglionectomy was performed on the right side. At this operation the common iliac veins were found to unite to form the inferior vena cava at about the level of the second lumbar vertebra instead of at the level of the fifth lumbar vertebra. These veins lay in close apposition and not on either side of the aorta, as described in Cunningham's "Textbook of Anatomy". Two sympathetic ganglia were found posterior to, instead of anterior to, the right lumbar veins, and this abnormality increased the difficulty of the operation. Two lumbar glands and two ganglia removed at operation were submitted to pathological examination, and one gland and one ganglion were found to be inflamed.

On May 24, 1934, considerable serous discharge escaped from the wound. The colour of the toes was better, though they were still very painful. Gangrene was present in the fourth toe.

On May 29, 1934, after the patient's foot was lowered to relieve pain, moist gangrene spread to the great toe, to the third and fourth toes, and to the dorsum of the foot. There was a foul smell. The patient's temperature was 39.4° C. (103° F.). Amputation was performed through the middle third of the leg. At the operation practically no arterial bleeding occurred, the large arteries being almost completely occluded. On pathological examination the arteries were found to be affected by arteriosclerosis, the changes being most pronounced in the *tunica media*.

On June 2, 1934, the sutures were removed owing to necrosis of the skin. On June 11, 1934, the patient's tongue was dry and brown and his mental condition was poor. Dr. Sinclair examined the patient and found some degree of toxic myocarditis. He also reported that the radial and temporal arteries were not thickened, and he recommended that tests of the renal function should be made. On June 12, 1934, the urea concentration test

yielded a figure of 3.3 one hour before injection of urea and 3.5 one hour afterwards. The blood urea was 30 milligrammes *per centum*.

On June 18, 1934, the patient's general condition was improved, though he had considerable pain in the stump, which was gradually healing. The blood pressure recorded on June 19, 1934, was 144 millimetres of mercury systolic and 90 millimetres diastolic.

In the discussion on this case it was pointed out that the patient was undoubtedly suffering from *thrombo-angiitis obliterans*. Emphasis was laid on the following points:

1. Whereas cigarette smoking was held to be a causative factor, this patient had been a pipe smoker until 1931.
2. The frequent blistering of the foot before definite symptoms were manifest.
3. The associated duodenal ulcer. In this regard the possibility of a common cause for the two conditions presented itself.
4. In view of the gross changes found in the arteries after amputation, it was difficult to explain why the left foot was completely relieved by sympathectomy. There was also doubt as to whether the relief of the condition in the left foot would be permanent.

Dermoid Tumour of the Pancreas.

DR. E. D. CLARK showed a woman, aged forty-nine years, from whose pancreas he had removed a dermoid tumour. The patient had been admitted to hospital complaining of an aching pain in the left side of the abdomen of six months' duration. On examination a bulging was found on the left side of the abdomen, and this was due to a hard, nodular, movable tumour extending under the left costal margin. The tumour was not tender.

At operation the abdomen was opened through a left paramedian incision and the rectus muscle was drawn to one side. The transverse mesocolon presented and a cyst was visible through it. The transverse mesocolon was divided and the cyst was found to extend to the pancreas and to be attached there. Peritoneum covered the entire cyst and it was therefore retroperitoneal. The cyst was partly evacuated by means of a sucker. The peritoneum was then stripped from near the base of the tumour. Profuse hæmorrhage occurred from several large veins, which were clamped. The cyst was then fully evacuated and its base was isolated. The base was transfixed and ligated. Further free bleeding occurred from large veins situated near the inferior *vena cava*. The veins were ligated, but some oozing still occurred, and eventually a gauze strip was packed into the wound and brought out through the abdominal incision. A tube was inserted in this region and the abdomen was closed in the usual manner. The patient at this time was very collapsed, the pulse being almost imperceptible at the wrist. She was given 1.7 cubic centimetres of "Coramine" and an intravenous injection of saline solution. Her condition improved, but she was still somewhat collapsed when she left the theatre.

The fluid from the cyst on examination was found to contain an amylase. Its reaction was weakly alkaline. The cyst was found to be a dermoid and consisted of a mass of tissue resembling the parenchyma of the pancreas. A microscopic section was demonstrated.

Fatal Hæmorrhage into a Carcinoma of the Ovary.

DR. H. LEAVER reported the history of a woman, aged sixty-one years, who had been admitted to hospital on May 2, 1934, and who had died on the same day.

The patient was seen in private practice as an urgent case. She complained of urgent urinary symptoms. She was unwilling to leave the commode and was able to pass only a few drops of urine from time to time. The patient was restless and anxious. A tumour was felt extending to the umbilicus. Only a few drops of urine were obtained on passing a catheter. A diagnosis of sudden hæmorrhage into an ovarian cyst was made and the patient brought into hospital and an immediate operation was performed.

The abdomen was found to be full of blood. Large masses of honeycomb-like newgrowth were scooped out by the hand from the region of the right ovary. The patient

was pulseless and the abdomen was closed as rapidly as possible, but the growth appeared to be completely removed and little hæmorrhage appeared to be coming from the remains of the pedicle. The patient did not respond to restorative treatment and died.

At *post mortem* examination no primary growth was found in another organ. The slide showed large and small masses of cells with little stroma (encephaloid type). Some large thin-walled blood spaces and hæmorrhages were present.

Calcified Fibroid Tumour of the Uterus.

DR. E. L. NEWMAN showed a woman, aged thirty-five years. The patient had one child, aged fourteen years. She attended the maternity clinic during February, 1934. On examination a diagnosis of a seven months pregnancy was made. A large hard tumour, the size of an orange, was felt to the side of the uterus on the right; it was neither painful nor tender. It appeared to be continuous with or part of the uterus. The patient was admitted to hospital.

Dr. Sear examined the patient by X rays and reported that the position of the fœtus was left occipito-anterior. There was also a large rounded calcified mass with some irregular shadows in the right side of the abdomen. Dr. Sear said that it was difficult to be sure as to whether this was intrauterine or extrauterine. If the former, it suggested a lithopædian; if the latter, it was probably a calcified mesenteric cyst. Dr. Sear thought that it was probably the latter. The patient was discharged.

She was readmitted to hospital on March 22, 1934, and was delivered of a still-born macerated fœtus. Convalescence was normal. The patient was very anxious to have another child. The tumour was still palpable and another smaller tumour on the anterior wall of the uterus was discovered.

At operation a large calcified fibroid was found growing on the lateral wall of the uterus, between the layers of the broad ligament. A linear incision was made between the round ligament and the tube and parallel with the round ligament. The tumour was shelled out without difficulty and a smaller fibroid, the size of a hen's egg, was removed from the anterior wall of the uterus. Hysterectomy was not performed, as the patient was very desirous of having another child. The specimen was shown.

Head Nodding.

DR. A. E. ASPINALL showed a female infant, aged seven months. The child had been adopted at one month. No reaction occurred to the Wassermann test. Both parents were said to be healthy; the mother had an easy confinement. The child's birth weight was 3.6 kilograms (eight pounds); its weight at the time of the meeting was 7.6 kilograms (seventeen pounds).

When the child was four and a half months old slight head nodding was noticed; it was much worse for the month prior to the meeting. The left eye had been turned in slightly for at least six months, and there had been slight photophobia. The infant could stand while holding on to the cot and would say "Dad".

On examination head nodding was present; it was worse when the child turned to look at an object. Strabismus of the left eye was present and there was intermittent nystagmus.

(To be continued.)

NOMINATIONS AND ELECTIONS.

THE undermentioned have been nominated for election as members of the New South Wales Branch of the British Medical Association:

Swinburn, Robert, M.B., B.S., 1931 (Univ. Sydney),
3, Captain Piper Road, Vaucluse.

Gelkie, Gertrude, M.B., B.S., 1927 (Univ. Sydney),
Royal Alexandra Hospital for Children, Camperdown.

Selby, Clive Herbert, M.B., B.S., 1933 (Univ. Sydney),
Marley, Werona Avenue, Gorden.

Australasian Medical Publishing Company, Limited.

ANNUAL MEETING.

THE annual meeting of the Australasian Medical Publishing Company, Limited, was held at The Printing House, Seamer Street, Glebe, on August 29, 1934. In the absence of the Chairman, Dr. T. W. Lipscomb, Sir Henry Newland occupied the chair.

Directors' Report.

The Directors' report was presented as follows:

The Directors submit their report for the past year and the balance sheet as at June 30, 1934, together with the profit and loss account for the twelve months ended June 30, 1934.

THE MEDICAL JOURNAL OF AUSTRALIA retains its position as a scientific publication and maintains its popularity.

The output of the printing and publishing department is still increasing, although this is offset to a certain extent by a reduction in the selling prices as a result of competition.

A small surplus remains after provision has been made for debenture interest, and the Directors have pleasure in authorizing the payment in full of debenture interest for the year ended June 30, 1934.

On August 30, 1933, agreements were signed with the representatives of the holders of debentures Series "B", "C" and "C2", which had the effect of satisfying in full all claims for arrears of debenture interest to June 30, 1933.

In order to give some assistance to the Chairman of Directors (Dr. T. W. Lipscomb), who is at present in England, the Directors consider it advisable that the vacancy on the Board be filled, and recommend that Dr. Arthur Madgwick Davidson, of Sydney, be appointed a Director.

Dr. T. W. Lipscomb and Dr. R. H. Fetherston retire from office by rotation, in accordance with the Articles of Association (Article 39). They are eligible and present themselves for reelection.

H. S. NEWLAND,
Chairman.

August 29, 1934.

Election of Directors.

Dr. T. W. Lipscomb and Dr. R. H. Fetherston were reelected to the Board of Directors.

Dr. A. M. Davidson was elected to the Board of Directors.

Correspondence.

PHYSICAL THERAPY.

SIR: As it is the earnest desire of the members of the Australasian Massage Association that, in the interests of all concerned, fully qualified persons only should be employed by the medical profession, the following facts are placed before your readers.

The Australasian Massage Association is the only recognized school of training for massage, medical gymnastics and medical electricity throughout Australia, and its curriculum is the only one providing its students with a sound scientific training arranged for at the university and the public hospitals.

Its membership consists entirely of its own trainees and those applicants from overseas who hold certificates from training schools of a similar high standard and pass the prescribed examinations.

The curriculum extends over a period of two years and consists of courses in anatomy (including three terms of dissections), physiology, experimental physiology, histology, medical electricity, Swedish remedial exercises, pathology, reeducational and corrective exercises, psychology, splinting *et cetera*. During their training the students

treat patients under supervision for one year (in New South Wales at the Royal Prince Alfred Hospital and the Royal Alexandra Hospital for Children) and in addition they attend, as time permits, the clinics of the orthopaedic surgeons in these hospitals.

A special feature of the curriculum is the training of students by an orthopaedic surgeon in the treatment of every type of spinal insufficiency, deformities, nerve lesions *et cetera*. Every effort is made to employ the simplest and most effective form of apparatus.

Such institutions as the Royal Prince Alfred Hospital, Sydney Hospital, Royal Alexandra Hospital for Children and Royal North Shore Hospital employ only members of the Australasian Massage Association on their massage staff.

It is with the object of maintaining this high standard of treatment and thus promoting the welfare of the public that we are again bringing before your readers the claims of our and their trainees.

Yours, etc.,

EDWARD T. THEING, F.R.C.S.,
President,
New South Wales Branch of the
Australasian Massage Association.

185, Elizabeth Street,
Sydney,
August 18, 1934.

TOXIC GOITRE.

SIR: Having read the papers by Dr. Holmes à Court and Dr. George Bell on toxic goitre, I feel I cannot let the matter pass without some comment on the principles of treatment as laid down by them. Dr. Holmes à Court makes no allusion to any possible cause for goitre; he accepts it as it is and treats it accordingly. Dr. Bell does refer to septic foci having some possible relationship to goitre, as he had one case in which septic teeth were extracted. He strongly advises against the removal of a septic focus prior to operation, as it may endanger the patient's life. The accepted attitude seems to be that once a thyroid gland is diseased it will remain so for all time. If this attitude is correct, the removal of a large portion of the thyroid is justifiable. My own experience of treating goitres during the last twenty-eight years has shown that in those cases in which it is possible to remove the focus of infection completely, the enlargement has entirely disappeared as long as it contained no nodules; and if it did, the thyroid tissue has shrunk and the nodules have remained, but the thyroid did not show any signs of hyperactivity or produce toxic symptoms. In my experience there has never been any necessity to operate on a thyroid when the focus causing the disease has been removed. No toxic or exophthalmic goitre should ever be allowed to get into the condition when it endangers the patient's life to have tonsils or other foci of sepsis removed. If the focus is removed there is no need for the use of iodine at any time, though it may slightly hasten the recovery. We cannot go on for ever ignoring these facts. The onus is on the medical attendant to locate and remove the focus.

The present attitude in regard to goitre of any kind is one of complete indifference as to any possible cause. No satisfactory treatment can be meted out to any disease without knowing the cause and removing it. When the causative agent is removed nothing further need be done, as resolution invariably takes place. The thyroid is in no way different to any other tissue or organ. It is liable to the same infections as they are. If goitres can and are constantly being cured by removing infections, why operate? The removal of tonsils by enucleation almost invariably produces a most profound toxic absorption, which can be completely avoided by treating them piecemeal by diathermy. The same toxemia is frequently produced by the wholesale removal of pyorrhoeal teeth. Dr. Scot Skirving says the object of these papers is to make better and more competent doctors of us. We are not gaining any ground by operating on goitres. One case cured without operation reflects more credit to our profes-

sion than ten improved by operation. Operation is justifiable when the focus is impossible of removal. There is no such thing as a goitre without an infective focus, except those congenitally produced. All the research work done by McCarrison and others has time and time again shown that an infective or toxic agent is at work. In the same way that a joint is vulnerable to many organisms so is a thyroid; even the gonococcus has been known on various occasions to cause toxic goitre. It is the half-hearted method in which a search for infections is carried out that is the fault, and not the principle that is wrong. Except for a very few conditions, bacterial invasion is the cause of disease, irrespective of the tissue involved.

I sincerely trust that there are some young men keen enough to satisfy themselves that goitres can be cured without operation, instead of blindly accepting the current view of the present time. Treatment by X rays with the focus unremoved cannot lead to very satisfactory results, though I have found it useful in hastening the resolution of an enlarged thyroid after the infection has been removed.

Yours, etc.,

SYDNEY PERN.

12, Collins Street,
Melbourne,
August 29, 1934.

OVARIAN HÆMORRHAGE.

Sir: I am in a position to enable Dr. R. Errol Maffey to add one to his cases of ovarian hæmorrhage.

On February 20, 1929, I was called to see a single girl, twenty years of age. Since January 19 of the same year I had been treating her for a condition the main feature of which was anxiety about what she supposed was her weak heart. There were no pelvic symptoms.

On February 20 she told me she had had severe pain for two days. She referred it to the right iliac fossa. In addition she had had pain at the right shoulder for two days and another pain for one day, referred to the left shoulder. On palpation there was very marked tenderness over the whole of the right iliac fossa.

My provisional diagnosis was a ruptured ectopic gestation. I failed to elicit a confirmatory history, except to the extent already indicated, but advised operation without waiting for any further investigation.

Opening through Battle's incision I found hæmorrhage proceeding from a cyst of the right ovary. The blood was removed, the ovary excised, and the patient made an uneventful recovery.

Yours, etc.,

ROWLAND C. EDWARDS.

530, New Canterbury Road,
Dulwich Hill,
New South Wales,
August 25, 1934.

Proceedings of the Australian Medical Boards.

NEW SOUTH WALES.

THE undermentioned have been registered, pursuant to the provisions of the *Medical Act, 1912 and 1915*, as duly qualified medical practitioners:

- Agnew, Ainslie Francis, M.B., B.S., 1926 (Univ. Melbourne), 10, Erin Street, West Richmond, Victoria.
Birch, John Bright, M.B., B.S., 1915 (Univ. Adelaide), F.R.C.S., 1933 (Edinburgh), Tweed Heads.
Bull, Noel Tracey, M.B., Ch.B., 1915 (Univ. Melbourne), Collaroy.
Macfarlane, Kenneth Horton, M.B., B.S., 1926 (Univ. Melbourne), 35, Wattle Valley Road, Canterbury, Victoria.
Richards, Clarence, M.B., B.S., 1919 (Univ. Adelaide), William Street, Broken Hill.

- Abramovitch, Hyman, M.B., B.S., 1934 (Univ. Sydney), Canterbury District Hospital, Campsie.
McMahon, Patrick Joseph, M.B., B.S., 1934 (Univ. Sydney), 14A, Dudley Street, Randwick.
Malouf, Naaman George, M.B., B.S., 1934 (Univ. Sydney), 15, Blenheim Street, Randwick.
Meyers, Edwin Solomon Alexander, M.B., B.S., 1934 (Univ. Sydney), Nimbin.
Scobie, Roden Crichton, M.B., B.S., 1934 (Univ. Sydney), William Street, East Maitland.
Walsh, John Owen, M.B., B.S., 1934 (Univ. Sydney), Saint Vincent's Hospital, Darlinghurst.
Abey, Arthur Montague, M.B., B.S., 1932 (Univ. Melbourne), Lockhart.
Mancy, Ernest Henry, M.B., B.S., 1930, M.D., 1933 (Univ. Melbourne), Henty.
Trahair, Geoffrey, M.B., B.S., 1933 (Univ. Melbourne), Callan Park Mental Hospital, Rozelle.

Additional qualifications registered:

- Noble, Ralph Athelstane, M.R.C.P., 1933 (London), 143, Macquarie Street, Sydney.
Rawle, Kenneth Charles Trineman, F.R.C.S., 1930 (England), Orange.

QUEENSLAND.

THE undermentioned have been registered, pursuant to the provisions of *The Medical Acts, 1925 to 1933*, of Queensland, as duly qualified medical practitioners:

- Hulme, John Gwydir, M.B., B.S., 1932 (Univ. Sydney), Toowoomba.
Radcliffe, John Rothwell, M.B., 1934 (Univ. Sydney), Brisbane.
Shellshear, Walter Guy, M.B., 1910 (Univ. Sydney), Sandgate.
Alberry, Gordon Walter Fabian, M.B., B.S., 1931 (Univ. Melbourne), Brisbane.
Barnett, Samuel Powell, M.B., B.S., 1927 (Univ. Adelaide), Mount Isa.
McIntyre, Fergus, M.B., 1914 (Univ. Sydney), Brisbane.

Obituary.

ALBAN BOWER BEST.

WE regret to announce the death of Dr. Alban Bower Best, which occurred on August 26, 1934, at East Kew, Victoria.

HECTOR RATH MACLEAN.

WE regret to announce the death of Dr. Hector Rath Maclean, which occurred on August 27, 1934, at Williamstown, Victoria.

Books Received.

THE MEDICAL ANNUAL: A YEAR BOOK OF TREATMENT AND PRACTITIONER'S INDEX, edited by H. L. Tidy, M.A., M.D., F.R.C.P., and A. R. Short, M.D., B.S., B.Sc., F.R.C.S.; 1934. Bristol: John Wright and Sons. Demy 8vo., pp. 745, with illustrations. Price: 20s. net.

OBSTETRIC MEDICINE: THE DIAGNOSIS AND MANAGEMENT OF THE COMMONER DISEASES IN RELATION TO PREGNANCY, edited by F. L. Adair, M.A., M.D., F.A.C.S., and E. J. Stieglitz, M.S., M.D., F.A.C.P.; 1934. Philadelphia: Lea and Febiger. Royal 8vo., pp. 759, with illustrations. Price: \$3.00 net.

MODERN TREATMENT IN GENERAL PRACTICE, edited by C. P. G. Wakeley, D.Sc., F.R.C.S., F.R.S.E.; 1934. London: The Medical Press and Circular (Baillière, Tindall and Cox); Australia: Angus and Robertson. Demy 8vo., pp. 434, with illustrations. Price: 16s. net.

PRACTICAL MEDICINE SERIES, 1933: General Medicine, pp. 831; General Surgery, pp. 826; Urology, pp. 445; Pediatrics, pp. 548; Obstetrics, Gynecology, pp. 639; Eye, Ear, Nose, Throat, pp. 632; General Therapeutics, pp. 464; Neurology, Psychiatry, pp. 471; Dermatology, Syphilology, pp. 458; 1934. Chicago: The Year Book Publishers. Crown 8vo., with illustrations.

ATLAS OF EXTERNAL DISEASES OF THE EYE, by H. Neame, F.R.C.S.; 1934. London: J. and A. Churchill. Demy 8vo., pp. 110, with illustrations. Price: 15s. net.

SPINAL ANÆSTHESIA, TECHNIC AND CLINICAL APPLICATION, by G. R. Vohrs; 1934. St. Louis: The C. V. Mosby Company; Australia: W. Ramsay. Royal 8vo., pp. 269, with illustrations. Price: 32s. 6d. net.

Diary for the Month.

SEPT. 11.—Tasmanian Branch, B.M.A.: Branch.
SEPT. 11.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
SEPT. 14.—Queensland Branch, B.M.A.: Council.
SEPT. 18.—Tasmanian Branch, B.M.A.: Council.
SEPT. 18.—New South Wales Branch, B.M.A.: Ethics Committee.
SEPT. 19.—Western Australian Branch, B.M.A.: Branch.
SEPT. 19.—Victorian Branch, B.M.A.: Clinical Meeting.
SEPT. 20.—New South Wales Branch, B.M.A.: Clinical Meeting.
SEPT. 25.—New South Wales Branch, B.M.A.: Medical Politics Committee.
SEPT. 26.—Victorian Branch, B.M.A.: Council.
SEPT. 27.—South Australian Branch, B.M.A.: Branch.
SEPT. 27.—New South Wales Branch, B.M.A.: Branch.
SEPT. 28.—Queensland Branch, B.M.A.: Council.
SEPT. 28.—New South Wales Branch, B.M.A.: Annual Meeting of Delegates of the Affiliated Local Associations of Members with the Council.

Medical Appointments.

Dr. I. J. Flynn (B.M.A.) has been appointed Medical Officer of Health by the Bunbury Municipal Council, Western Australia.

Dr. D. J. McRae (B.M.A.) has been appointed Medical Officer of Health by the Geraldton Municipal Council, Western Australia.

Dr. A. W. Smith has been appointed Honorary Assistant Urologist at the Prince Henry Hospital, Office of the Director-General of Public Health, New South Wales.

Dr. B. Van Someren has been appointed a Medical Officer, Medical Branch, Department of Public Instruction, New South Wales.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser," pages xvi, xvii and xix.

CHILDREN'S HOSPITAL (INCORPORATED), PERTH, WESTERN AUSTRALIA: Junior Resident Medical Officers.
DEPARTMENT OF PUBLIC HEALTH, PERTH, WESTERN AUSTRALIA: Junior Resident Medical Officer.
FREMANTLE HOSPITAL, FREMANTLE, WESTERN AUSTRALIA: Resident Junior Medical Officer.
LAUNCESTON PUBLIC HOSPITAL, LAUNCESTON, TASMANIA: Resident Medical Officers.
MATER MISERICORDIÆ CHILDREN'S HOSPITAL, BRISBANE, QUEENSLAND: Resident Medical Officer.
ROYAL PRINCE ALFRED HOSPITAL, SYDNEY, NEW SOUTH WALES: Radiologist.
ROYAL SOCIETY FOR THE WELFARE OF MOTHERS AND BABIES, SYDNEY, NEW SOUTH WALES: Junior Honorary Medical Officer.
THE ANGLEDPOOL HOSPITAL, ANGLEDPOOL, NEW SOUTH WALES: Medical Officer.
THE MOSSMAN HOSPITALS BOARD, MOSSMAN, NORTH QUEENSLAND: Medical Superintendent.
THE TOOWOOMBA HOSPITALS BOARD, TOOWOOMBA, QUEENSLAND: Resident Medical Officer.
THE WOMEN'S HOSPITAL, CROWN STREET, SYDNEY, NEW SOUTH WALES: Junior Resident Medical Officer.
VICTORIAN EYE AND EAR HOSPITAL, MELBOURNE, VICTORIA: Resident Surgeons.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phoenix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Brisbane Associated Friendly Societies' Medical Institute. Chillagoe Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL are advised, in their own interests, to submit a copy of their agreement to the Council before signing. Lower Burdekin District Hospital, Ayr. Innisfail Hospitals Board.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	Combined Friendly Societies, Clarendon and Kangarilla Districts. Office of Health, District Council of Elliston. All Lodge Appointments in South Australia. All Contract Practice Appointments in South Australia.
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